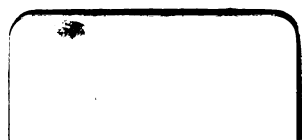

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THE
CHINA SEA
DIRECTORY.
VOL. II. 1879.



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THE
CHINA SEA DIRECTORY.

VOL. II.

CONTAINING
**DIRECTIONS FOR THE NAVIGATION OF THE
CHINA SEA,
BETWEEN SINGAPORE AND HONG KONG.**

COMPILED IN THE HYDROGRAPHIC DEPARTMENT, ADMIRALTY.

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**SECOND EDITION.**



**PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.**

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## ADVERTISEMENT TO SECOND EDITION.

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THE China Sea Directory, Vol. II., contains a description of the China Sea, between Singapore and Hong Kong ; and also directions for its navigation in both monsoons.

The material used in the compilation has been gathered from the surveys of Captains Bethune and Sir E. Belcher ; Commanders Bate, Ward, and Bullock ; Lieutenant Gordon, and Navigating Lieutenants Richards, Reed, and Tizard, Royal Navy (1844-65) ; also of Captains Ross and Maughan, Indian Navy (1806-10) ; and various detached French and Spanish surveys. Horsburgh's Directory, the Nautical and Mercantile Marine magazines, recent Remark books of Her Majesty's ships, and various documents in the Hydrographic Office have further been consulted.

The islands and dangers between Singapore and Borneo are from the surveys of Navigating Lieutenant Reed made in 1862. South Natuna islands from Lieutenant Gordon in 1847 ; North Natuna and Anamba islands chiefly on the authority of Captain Laplace, French corvette *Favorite*, 1831 ; but as these groups are only partially surveyed, their coasts should be approached with caution.

The numerous scattered dangers between the shoals forming the western boundary of the Palawan passage and those fringing the eastern side of the Main navigable route through the China Sea, are little known, and no vessel can come within these limits without risk.

The description of the west coast of Borneo is chiefly from the survey of Lieutenant Blommendal, Netherlands Royal Navy ; but as this is yet imperfectly explored, it should be navigated with caution.

The western coasts of the Philippine islands are only partially surveyed ; the mariner is warned accordingly.

The coasts of Cochin China are at present but partially explored. Their description is chiefly from the surveys of Captains Ross and Maughan, I.N., 1806-10 ; and from French Government surveys, included between the years 1857-77.

The information relating to the coasts of Hainan island and strait, has been derived chiefly from the remarks of officers of H.M. ships employed on the China station. The south-east coast, from Gaalong bay to False Tinhosa island, is from an examination made by Captain Ross in 1817.

The coast from Hainan to the Canton river is little known ; the account is chiefly from the examination of Captains Ross and Maughan, I.N.

This volume was originally compiled in 1868 by Staff-Commanders Reed and King, Royal Navy. The present edition has been prepared by Staff-Commander Hitchfield.

As this volume embraces so large an extent of sea and coast, and so many dangers imperfectly explored, it must necessarily be considered incomplete, and will furnish frequent occasions for revision. Seamen are therefore invited to transmit notice of any errors or omissions they may discover.

F. J. E.

Hydrographic Office, Admiralty, London,  
June, 1879.

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# THE CHINA SEA DIRECTORY.

VOL. II.

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## CHAPTER I.

### MONSOONS, TYPHOONS, CURRENTS, AND TIDES IN THE CHINA SEA.—WITH DIRECTIONS FOR MAKING PASSAGES.\*

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**The South-west Monsoon**† generally commences in the China sea about the middle or end of April, and continues to the beginning or middle of October, liable to an acceleration or retardation of twelve or fifteen days. It sets in sooner about the gulf of Siam and Tong King gulf, and along the western coasts, than in the open sea, or near the coasts of China, Palawan, and Luzon. It also continues longer to the southward of the parallel of  $11^{\circ}$  N. than in the northern part of the sea, where it generally terminates about the first week in September; for southerly winds frequently prevail between Singapore and Pulo Sapatu until the middle of October, when north-east and easterly winds are blowing on the China coast.

In May the winds are often light and variable in the open sea, and easterly or south-east winds are likely to occur for a day or two at a time during the whole of the south-west monsoon; particularly in the northern part of the China sea, where these winds are frequently experienced in both monsoons.

The south-west monsoon is strongest, and least liable to change, in June, July, and August, at which period there is at times much rain and cloudy weather all over the China sea; in these months, and also in May, sudden hard squalls blow sometimes out of the gulf of Siam,‡ as far as Pulo Condore and Pulo Sapatu. When dense clouds are perceived to rise, indicating the approach of these squalls, sail ought to be reduced without delay.

From the gulf of Siam to cape Padaran, the south-west monsoon blows nearly parallel to the coast; and if close in, a light wind from the land is at times experienced at night, succeeded by a short interval of calm on

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\* Eastern routes to China :—See China Sea Directory, vol. III., 1874, pages 44–55 and 564–572.

† See Admiralty Wind and Current charts for Pacific, Atlantic, and Indian oceans, 1879.

‡ For Winds and Weather in the gulf of Siam, see page 294.

the following morning. The monsoon breeze then sets in, and generally continues brisk during the day. These land and sea breezes prevail most on the coast of Cochin China, from cape Padaran northward to Tong King gulf; for the sea wind dies away almost every evening on this coast during this monsoon, and a land breeze comes off in the night, although not at a regular hour. This is followed by calms or light airs, which frequently continue until noon; the sea breeze then sets in from the south-east.

In September and in the greater part of October the winds off the north extremity of Borneo and the south-west end of Palawan (*see* page 5) generally blow strong from the south-westward, with dark cloudy weather and much rain.

In March and April there are land and sea breezes on the coast of Luzon, with fine weather; but after the south-west monsoon sets in strong in June, and from that time until it abates in October, the weather is mostly cloudy; and the winds blowing from the sea upon that coast are generally accompanied with much rain.

On the coasts of China, both monsoons are subject to the same variations generally as those in the China sea. In the south-west monsoon the winds are not so constant from one quarter of the compass as they are in the north-east monsoon; land and sea breezes occur near the coast, so that there is not the difficulty in getting southward against the south-west monsoon, as there is in getting northward against the north-east monsoon. On the south-coast of China, the winds during the south-west monsoon prevail frequently at South and S.S.E. Strong north-east gales have been sometimes experienced on the coast of China during the south-west monsoon.

**The North-east Monsoon** usually begins in the northern part of the China sea about the end of September or early in October; but in the southern part it seldom blows steadily till November; light southern or variable breezes prevailing the greater part of October. This monsoon generally sets in with a gale, which sometimes comes down without warning, and with a violence that has exposed several vessels to great danger: therefore, when the monsoon is about to change, they should avoid anchoring in exposed positions, and weigh instantly if caught, as the swell rises with such rapidity as to cause a difficulty in getting the anchor. The first burst of the monsoon frequently lasts a week or ten days. The weather in some years is settled and fine, during September and October; but the equinox is a very precarious period, for within a few days of it storms are likely to happen.

In December and January the north-east monsoon blows more steadily and with greater strength. The weather in these months is frequently cloudy, with much rain and a turbulent sea, particularly about Pulo Sapatu, and thence to the entrance of Singapore strait; there are, however, considerable intervals of fine weather. On the coast of Palawan (*see* page 5) the winds are variable in November, and the early part of December, by which vessels pass along that coast either to the north-

east or south-west, but the weather is often dark, rainy, and cloudy. On the coast of Luzon the winds are frequently variable during this monsoon, generally from the northward and north-east; but veer to the north-west and westward at times, and blow strong, with cloudy weather and rain. In Tong King gulf, in November, there are sometimes light land breezes close to the coast; but the north-east monsoon prevails along the coast of Cochin China, as far southward as cape Padaran, generally from September or the early part of October, to the beginning or middle of April.

In February the strength of the north-east monsoon abates. During this month and March it blows moderately, with steady weather all over the China sea, inclining to land and sea breezes on the coast of Luzon.\*

On the southern coast of China, when the north-east monsoon prevails, the winds blow mostly from E.N.E. parallel to the shore: they veer, and blow off the land at times, and also from the south-east, but there are seldom any regular land or sea breezes on that coast.

**Typhoons.**—These dangerous tempests occur in the northern part of the China sea, near Formosa, the Bashi islands, and the north end of Luzon; also to the eastward of those islands, and between Formosa and the Japan archipelago. They usually blow with the greatest fury near the land; as the distance is increased to the southward from the coast of China, their violence generally abates, and they seldom reach to the south of lat,  $14^{\circ}$  N., although a severe gale has been experienced at times two or three degrees farther southward.

Typhoons are liable to occur in both monsoons; but they are usually less severe in the China sea, in May, November or December; although in the vicinity of Formosa and the Bashi islands there are sometimes furious gusts in November. From December to May they seldom happen; those that have been experienced in June and July were the most violent; many vessels have been dismasted and sustained other damage by them. The months of August, September, and October are also subject to these tempests. The September equinox is a very precarious period, particularly if the change or perigee of the moon coincide with the equinox; when this has been the case, typhoons have happened several years at the equinox in September, on the coast of China, and many vessels have been dismasted on the 21st or 22nd of that month.

To prognosticate these tempests would be very useful to navigators, but this cannot be done with certainty, for they frequently commence without giving much indication of their approach. The clouds having a red aspect

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\* These remarks are from Horsburgh,—but Navigating Lieutenant J. W. Reed, R.N. observes, “From my own experience, and from inquiries made of many captains accustomed to the navigation of the China sea, I am of opinion that strong winds and unsettled weather will generally be experienced during the month of February, and that moderate breezes and settled weather are exceptional in that month.”

is not a certain warning of the approach of a typhoon; for, at the rising, but more particularly at the setting of the sun, the clouds, especially those opposite to it in settled weather, are sometimes tinged with a deep red colour by the reflected light. Neither is an irregular swell a good criterion to judge of their approach; for near the coast of China a cross swell frequently prevails during steady settled weather. A hazy atmosphere, preventing land from being seen at great distances, is no unfavourable sign on the coast of China; for this is generally its state in settled weather. A serene sky, with the horizon remarkably clear, should not be considered an indication of a continuance of favourable weather; for a series of fine weather and calms, favouring an increase of heat above the mean temperature, is likely to be succeeded by a typhoon. When the horizon is very clear in some parts, and the summits of the hills or islands obscured by dense black clouds, there is some irregularity in the atmosphere, and stormy weather may be apprehended; but in reality, typhoons are seldom preceded by any certain sign or indication. The barometer affords the best means of anticipating their approach; for, on the south coast of China, there is a greater fall of the mercury than might be expected within the tropics.\*

Typhoons always come from the eastern limits of the China sea, and assume a course generally W.N.W., but varying from that to W.S.W., and sometimes northward and southward of these bearings. There is, however, now considerably less danger in meeting these furious tempests, owing to the skill and research of Mr. W. C. Redfield, Colonel Sir William Reid, Mr. H. Piddington, and others who have collected a vast number of facts bearing upon the subject. It is found that their progress is governed by a general law, and consequently the vortex can be avoided, and the vessel's safety assured by attention to a practical rule, which is this:†—Look to the wind's eye,—set its bearing by compass,—and the 8th point to the *right* thereof, in North latitude, will be the bearing of the centre of the storm. For example, suppose the vessel to be in lat. 18° N., the wind East, and the barometer and sky indicating a coming gale,—then, look at the compass, take the 8th point to the *right* of East, and South is the bearing of the brewing storm, *if it be* of a revolving type. In this case, the vessel will be on the northern edge of the storm-field.

In the northern part of the China sea, a low barometer for several days previous, an ugly threatening appearance, and heavy swell, will give sufficient warning, and, provided it be taken, will enable vessels

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\* We rode out two heavy typhoons during the month of July 1841. The first, which occurred on the 21st in Macao outer roads, was prognosticated by calms, sultry weather, increased temperature, and by the barometer falling gradually to 29·40 before the typhoon burst upon us; its lowest was 28·80. The other, which occurred on the 26th at Hong Kong, gave but little warning of its approach; the barometer fell to 28·40.—Mr. J. W. King, Master, H.M.S. *Modeste*.

† See Remarks on Revolving Storms, published by order of the Lords Commissioners of the Admiralty, 1875.

to get sufficient sea room so as to avoid the centre of the storm, or to secure safe anchorage.

**Gales** sometimes blow steadily from E.N.E. or N.E. several days at a time, in September or October, near the south coast of China. In the same months they are liable to happen on the west coast of Luzon. Here, they mostly commence at North or N.W., and veer to West, S.W. or South, blowing strong from all these directions, with heavy rain, and a cross turbulent sea; but they seldom continue long.

In May, June, July, and August, severe gales are at times experienced in the north-western part of the China sea, particularly between lat. 14° N. and Hainan island, with Tong King gulf open. These gales generally begin at N.N.W. or N.W., and blow with violence out of the gulf, accompanied by dark weather and a deluge of rain: from N.W. they veer to West and S.W., still blowing strong, and abate as they veer more southerly. When these N.W. gales are blowing in the vicinity of Hainan and the coast of Cochin China, strong S.W. or southerly gales generally prevail at the same time, in the middle of the China Sea.

**Squalls** are common during both monsoons, the most dangerous are those known as the Arch squalls. When clouds are seen rising from the horizon in the shape of an arch, sail should at once be shortened as a heavy gust of wind may be expected; these squalls when the arch is near the zenith are accompanied by heavy rain.\*

**Winds on Coast of Palawan.**†—The monsoons on this coast are so subject to interruption, being influenced by local circumstances and other causes, that it is difficult to say at what period either fairly sets in, and therefore we can only give our experience of the weather generally in each of the consecutive months of the year, except those of February and March, when the *Royalist* was in China.

The barometer is of little use in prognosticating the changes; the difference in the column of mercury for the whole year, except in cases where the condition of the atmosphere has been disturbed by some physical cause, such as the approach of a Typhoon, seldom exceeding two-tenths of an inch. In general the mercury rises to north-east and easterly winds, and falls to south-west and westerly; but in some instances we have known the reverse of this to occur, doubtless from some such disturbing cause as above mentioned, when the barometer by falling or rising indicates as usual the approach and recession of the vortex.

In January, when the north-east monsoon is blowing steadily, and sometimes with great violence, in the China sea, moderate north-east and

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\* Staff Commander T. H. Tizard, 1879.

† By the late Capt. W. T. Bate, R.N., who surveyed this coast in H.M.S. *Royalist*, in 1850–54.

easterly winds prevail on the coasts of Palawan, and in Luzon, and land and sea breezes have been experienced with considerable regularity.

In April, when light north-east and frequently south-east winds prevail in the China sea, north-east and easterly winds usually blow steadily on the coast of Palawan, freshening considerably after daylight, and dying away towards sunset.

May, and the early part of June, appear to be the finest period of the year on the coast of Palawan, when land and sea breezes prevail with tolerable regularity, the former coming from the south and south-east in the morning, and the latter from the north and north-west in the afternoon.

Towards the end of June, and throughout July, unsettled weather, generally commencing about the change [of moon, may be expected. A slight depression of the mercury, after a succession of fine weather, frequently indicates the approach of strong squalls from the W.S.W., which are usually accompanied by dark cloudy weather and much rain, lasting for a week or ten days. These are generally succeeded by a period of fine weather, with north-west and south-west winds, which draw to the southward and eastward in the morning. If June or July have been unsettled, it may be expected that August generally will be fine, with moderate south-west, but more frequently westerly winds, particularly in the afternoon. If, on the contrary, June or July has been tolerably fine, very unsettled weather may be expected in August; in either of these months when strong south-west squalls have succeeded a period of fine weather, vessels will not unfrequently in the south-west part of the passage experience a weatherly set of the current.

In September and October the wind generally blows strong from the W.S.W., with dark cloudy weather; and off the south-west end of Palawan, squalls, which veer to W.N.W. and N.W., sometimes blowing with great violence, succeed each other rapidly, and are accompanied by rain. Between the squalls the wind frequently shifts to south-east.

In November and December the weather is variable; north-east and easterly winds, changing at times to south-east, more frequently prevail; but it is not unusual, especially in the former month, to have a south-westerly blow, with dark cloudy weather and rain. One of the heaviest gales experienced on the coast of Palawan, which shifted round to north-west, occurred in November, just before the change of moon, and lasted till the end of the quarter.

**Currents in South-west Monsoon.**—The currents in the China sea are very changeable, their direction and velocity depending much upon local circumstances. Late in April, or early in May, they generally begin to set to the northward, in the southern and middle parts of the sea, and continue to run in a north-easterly direction until September, while the south-west monsoon is strong; but they are not constant in this monsoon, for at times, when the wind is moderate or light, they are liable



to change and set in various directions. After the strength of the monsoon has abated, there is often little or no current in the open sea, running to the north-eastward ; but sometimes its direction is to the southward.

Along the coast of Cochin China, from Pulo Obi to cape Padaran, the currents sets mostly to the E.N.E., parallel to the shore, from April to the middle of October ; and during the same period its direction is generally to the northward along the east coast of the Malay peninsula, from the entrance of Singapore's strait to the gulf of Siam. To the northward of cape Padaran there is but little current during the south-west monsoon, near the Cochin China coast ; thence to Tong King gulf, a small drain is sometimes found setting northward, at other times southward. When a gale blows out of the latter gulf from the north-west and westward, the current sets generally to the south-west or southward, in the vicinity of the Paracel islands and reefs, or where these gales are experienced ; and this current running obliquely, or contrary to the wind, produces a turbulent and high sea.

On the southern coast of China the current is much governed by the wind ; when strong S.W. winds prevail, it runs along shore to the eastward, but seldom strong. Near, and among the islands, westward of Macao, there is generally a westerly current, occasioned by the freshets from Canton river, which set in that direction ; frequently sweeping along the islands from Macao to St. John between W.S.W. and W.N.W., about one or 2 knots per hour. This westerly current is, however, not always constant during the south-west monsoon, a weak tide may sometimes be experienced running eastward.

On the coasts of Luzon and Palawan, the current generally sets northward in the south-west monsoon, but frequently there is no current, and near these coasts it seldom runs strong. Near the Bashi islands, it sometimes sets eastward when strongly westerly winds prevail ; but generally strongly to the northward, or between N.N.W. and N.E.

**Currents in North-east Monsoon.**—The current in the China sea during the north-east monsoon, generally, runs south-westward, with a velocity depending on the strength of the wind. When the force of the monsoon is abated, or during moderate and light breezes, there is often little or no current.

In the western parts of the sea, along the coasts of Cochin China and the Malay peninsula, the current generally, begins to run to the southward about the middle of October (sometimes sooner on the former coast), and continues until April. During the month of March its direction is constantly to the southward about Pulo Aor, with light easterly winds and calm at times. On the coast of Cochin China, and adjacent to Hainan island, a current varying from South to S.W., commences sometimes about the middle of September ; near the land, from lat.  $15^{\circ}$  N. to  $11^{\circ}$  or  $11\frac{1}{2}^{\circ}$  N., it increases in strength ; but its rate decreases in proportion as it flows southward. During the prevalence

of the north-east monsoon, from about lat.  $14^{\circ}$  N. to cape Padaran, the current near the coast frequently runs 40 or 50, and sometimes 60 miles to the southward in 24 hours; the rate, however, is variable, and it is only in the limits above mentioned that it is occasionally so strong, for its strength abates at cape Padaran, and runs with less velocity to the S.W., towards the entrance of the gulf of Siam.

On the southern coast of China, the current during the north-east monsoon, runs almost constantly to the W.S.W., nearly parallel to the land; and sometimes with inconceivable rapidity, when a Typhoon or a storm occurs. The current at 70 or 80 miles from the coast seldom runs so strong as near it; and in 30 or 40 fathoms soundings there is much less current than in shoal water, near the shore and amongst the islands. The westerly current sometimes slacks, and, contiguous to the land, is succeeded by a tide.

Between Formosa and the China coast the current runs to the southward during the north-east monsoon. When strong N.E. winds prevail, its direction is generally to the S.W. or southward, between the south end of Formosa and the north end of Luzon; but in light variable winds, it often sets to the northward. On the west coast of Luzon the current is changeable, sometimes setting southward along the coast, at other times northward. On the coast of Palawan it is also governed by the prevailing winds, but seldom runs strong in any direction, unless impelled by severe gales. To the eastward of Formosa, in the vicinity of Botel Tobago island, it frequently runs strong to the northward and north-eastward, so early as the 1st of March; and although changeable at times, it sets mostly in that direction during the south-west monsoon; and in the opposite direction during the north-east monsoon.

#### DIRECTIONS FOR MAKING PASSAGES.

##### **Singapore to Hong Kong in South-west Monsoon.—**

When June approaches, and the south-west monsoon is fully set in, the track from Singapore to China by the Main route, eastward of Pulo Sapatu and over Macclesfield bank, is preferable, the winds being more steady in the open sea than near the coast. About full and change of the moon and as early as April, a westerly breeze will sometimes be found blowing out of the gulf of Siam (which will continue to Macclesfield bank), when easterly winds will be experienced to Hong Kong.\*

This route becomes precarious if a sailing vessel has not arrived in the vicinity of Pulo Sapatu early in October; for near this island, about the middle of that month, strong southerly currents begin to prevail with light northerly winds, variable airs, and calms, by which many vessels have been delayed for several days, and have made no progress to the northward. Fresh winds from the southward have been met with, even so late as 1st of November, but these instances are rare.

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\* See Admiralty charts:—China sea, southern portion, Nos. 2,660a, 2,660b, and Northern portion, Nos. 2,661a, 2,661b; scales,  $m = 0.05$  of an inch.

Some vessels proceeding by the Main route have carried strong S.W. and southerly winds, when others taking the Inner route have at the same time experienced N.W. and westerly gales blowing out of Tong King gulf, with dark weather and rain, and have been in danger of being driven among the Paracel reefs; the Inner route ought, however to be chosen in the strength of the south-west monsoon, for the sea will be smooth, and being near the land anchorage may be obtained if required. The gales out of the gulf are not frequent, and the land may be kept in sight nearly all the time.

Proceeding by the Inner route, steer from Pulo Aor along the coast to the Redang islands, thence across the gulf of Siam, and along the coasts of Cambodia and Cochin China, keeping the latter aboard to cape Touron, From thence steer for the south-west part of Hainan, coasting along this island and passing between it and the Taya islands; then steer to make the coast of China about Tien-pack, or Hai Ling island. The islands thence to Hong Kong may be coasted along at discretion, and shelter may be found amongst them on emergency. If this route be taken before the middle of March or the 1st of April, the passage will be tedious unless in a fast sailing vessel.

Bound to Hong Kong in the strength of the south-west monsoon, with the wind steady between S.E. and S.W., endeavour to make the Great Ladrone island bearing about North, then steer between it and the Kypong islands, and between Lingting and the Lema islands, for the west Lamma channel. After the middle of August, when easterly winds are likely to prevail several days together, as they are more or less at all seasons, it will be necessary to make the N.E. head of the Lema islands, and proceed in by the Lema channel, towards the west Lema channel. The east Lamma channel is also safe in both monsoons, for although the water is deep, if the wind fall light anchorage can be obtained, and there is little or no tide.

**Singapore to Hong Kong in North-east Monsoon.**—Vessels with full steam power after leaving Singapore strait should steer to pass about 2 or 3 miles north-westward of the Anamba islands, 5 to 10 miles north-west of Pulo Laut, and 30 miles west of Prince of Wales bank, when a course should be steered for lat.  $14^{\circ} 30'$  N. long.  $115^{\circ} 30'$  E., thence eastward of Macclesfield bank to Hong Kong.\* Sailing vessels leaving Singapore for China in February, March, and part of April, may expect a tedious passage, if the Main route be adopted. In March, April, or May, the Inner route along the coast of Cochin China is generally the most expeditious.

The passage to China by the coasts of Palawan and Luzon may be used

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\* Mr. E. M. Edmond, R.N.R., commanding P. and O. steam vessel *Hindustan*, 1879.

H.M.S. *Himalaya*, in February 1877, made the passage from Singapore to Hong Kong—by the main route—in 6 days 18 hours, during which, light north-easterly winds, and a slight favourable current were experienced. Remark book of Captain E. White, R.N.

late in the south-west monsoon; and is recommended as the best route during the north-east monsoon.\*

In December, January, and February† sailing vessels should not leave the entrance of Singapore strait, in strong north-east winds, but anchor on the northern shore, under the Water islands, in 9 or 10 fathoms. In those months gales often occur at new and full moon; the weather is then thick, the rain lasting two or three days, and the current outside accelerates to the S.S.E. from  $2\frac{1}{2}$  to 3 knots an hour. A vessel leaving the strait then, instead of fetching St. Barbe island, would fall bodily to leeward and have to work up the west coast of Borneo. Fine weather follows, with the wind backing round to North and N.W.; and the current in the offing decreases in strength to about  $1\frac{1}{4}$  knots.

Leave the Water islands with the first of the ebb and keep clean full. Steer to the north-eastward to go through the channel between Subi island and the Great Natuna; a passage that may without much difficulty be made in these months, especially at full and change, when the wind, after a few hours' calm, frequently hauls to the westward with squalls and rain, and then veers round to S.W. and South, blowing moderately for 24 hours.

By taking advantage of these changes, Subi may be easily weathered, and the intricate channels between it and the north-west coast of Borneo avoided. After arriving in the vicinity of Low island, in long.  $107^{\circ} 48' E.$ , if the wind continue easterly, steer to the northward on the starboard tack passing westward of Low island, keeping not less than 3 miles from its south-western side, to avoid the shoal water extending two miles from it. Give Haycock a berth of 3 or 4 miles in passing, as the coral shoal about

\* It was formerly the general custom for the clipper vessels employed in the opium trade between India and China to work up the middle of the China sea in the strength of the north-east monsoon, keeping as close to the western edges of the reefs as possible, where the current was found to be generally in their favour. Many commanders who had been accustomed to make their passages in that way are strongly of opinion that it is the best route for vessels later in the season than the month of November, whilst others who have been accustomed to proceed by the Palawan have just as strong opinions in favour of that route. The following remarks of Mr. T. B. White, who was for many years in command of clipper vessels engaged in the opium trade, appear to be exceedingly valuable, inasmuch as they furnish a balanced opinion on the respective advantages of these routes. He says:—"I am sorry I cannot say much from experience in beating up the Palawan in a sailing vessel, for during the entire period of my command of the *Lanrick* I never once went that way, but always along the western edges of the shoals. I am, however, now quite certain that I should often have made much quicker passages and saved much wear and tear by going up the Palawan. In the *Fiery Cross*, although a powerful steamer, I found it preferable to take the Palawan, and always did so during the strength of the N.E. monsoon (November to February), saving fuel and wear and tear; and, though a longer route, made better passages by getting smooth water and often favourable currents. I believe nearly all heavily laden ships now take the Palawan from October until the end of February in preference to the outer passage, and a current to the north-eastward is generally felt the nearer the Borneo coast is kept aboard, and usually the weather is moderate, with a rolling *beam* swell on; at least that has been my experience when going up in the steamer. Mr. Reynell, in the clipper *Water-witch*, usually took the Palawan in the N.E. monsoon, and made some very good passages. Now that it is so thoroughly well surveyed, I consider it quite as safe as the outer passage."

\* These directions (so far eastward as the Natuna islands) apply with equal force to vessels bound either to the gulf of Siam or the river Saigon. They have been compiled chiefly from "Sailing Directions between Singapore and the river Saigon, by Mr. A. J. Loftus, commanding the ship *Kensington*," published in the Nautical Magazine, December 1862.

that island extends fully 3 miles from its south-west side. Large vessels should not pass eastward of Haycock at night, as this locality is said to have hidden danger.

After passing Haycock there will be no difficulty in working up to the south-east point of the Great Natuna, as that island, when approached, from the south-west, shelters against the strong north-east current of the monsoon. Off its southern shore at night, in fine weather, the wind is off the land, which should not be approached nearer than 2 or 3 miles without a commanding breeze, as the water is deep close in shore, and no good anchorage can be obtained.

Vessels fetching to leeward of Subi with a northerly wind should take the Koti passage, between Pulo Panjung and Sirhassen island. The Sirhassen passage is also safe when the south side of Sirhassen island is kept aboard. The currents among these islands are more regular; but not so in the Api passage, where they set in various directions, and with great velocity to the S.W. from 16 to 19 hours at a time; for large vessels any of the other passages are preferable to this, for great caution and perseverance are requisite in working through, as the Borneo coast (in 10 to 11 fathoms water) must be kept aboard to avoid the current and profit by the land winds.\*

In taking the Koti passage, give Pulo Panjung a good berth to avoid the dangerous reef which surrounds it. The winds amongst these islands and as far eastward as the meridian of cape Sirik are generally from North to N.N.W. The passage cleared, proceed to the north-eastward; endeavouring, if not certain of the longitude, to make the Royal Charlotte or Louisa reef, whichever is the weathermost, by running on its parallel of latitude; and as the currents appear to be influenced by the prevailing winds, a set in the direction in which it is blowing should be anticipated, the velocity of the current being proportionate to the force of the wind.

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\* For steam vessels of small power, proceeding to China by the Palawan passage against the north-east monsoon, the route by the Api passage and the coast of Borneo presents the following advantages: first, light, variable winds and smooth water will often be found close to the Borneo coast, when a strong monsoon is blowing a hundred miles off it; and next the Api passage route affords convenient landmarks to lead a vessel safely and expeditiously to the entrance of the Palawan; whereas by the ordinary route much difficulty and delay frequently occurs in making Low island, and in passing between the Royal Charlotte and Louisa shoals.

Such vessels leaving Singapore should pass southward of Victory island, then steer to sight the small island of St. Pierre (carefully observing and allowing for the set of the current), and afterwards for the Api passage, keeping towards Marundum island rather than Tanjong Api. Having passed Marundum and Tanjong Datu, the course is clear up to the entrance of the Palawan, passing between the south Luconia shoals and Barram point, and keeping as close to the Borneo coast until abreast of that point as circumstances may make convenient.—Navigating Lieutenant J. W. Reed, commanding H.M. surveying vessel *Rifleman*, 1866.

Having made either the Royal Charlotte or Louisa reefs,\* or passing mid-channel between them, steer E. by N. 100 miles, thence about N.E. for lat.  $8^{\circ}$  N., long.  $116^{\circ} 15'$  E., when Balabac peak will probably be seen bearing about East-southerly, and making like a rather flat-topped island, with a small peak rising in the centre; when about 40 miles distant from the island, the low hills may be seen on either side of the peak, having at first the appearance of detached islands.

Having brought Balabac peak to bear about E.S.E. at the above distance, a N.N.E.  $\frac{3}{4}$  E. course should be steered, when the high land of Bulanhow (page 181), will soon be discernible, bearing about N.E. by E.  $\frac{3}{4}$  E. This course should lead about 10 miles westward of the elbow of the bank of soundings fronting Palawan island, and midway between the Royal Captain shoal and the edge of the bank (the most dangerous part of the channel). When Bulanhow mountain bears S.E. by E.  $\frac{1}{4}$  E. the vessel will be in line with it and the Royal Captain shoal, and in the narrowest part of the channel which is  $27\frac{3}{4}$  miles wide, and the high land of Mantaleengahan will then bear E.  $\frac{1}{4}$  S.

If the wind be well to the southward, and the weather thick, Balabac island may be approached nearer, in order to obtain a good observation of the land, but caution is necessary not to go within 12 miles of it, as soundings of 26 and 20 fathoms extend that distance off, in a westerly direction from the peak, having shoal patches immediately inside them.

If the wind be to the westward, with thick cloudy weather, Balabac island should not be approached nearer than 30 miles, as westerly winds usually force a strong current through the passage to the eastward, and off the south-west end of Palawan, it is not unusual, particularly in squalls, for the wind to veer to W.N.W., and sometimes N.W., blowing with great violence, and placing the vessel on a lee shore with respect to the shoals inside the edge of the bank. This weather generally prevails off the south-west end of Palawan, about September and October, rendering it uncertain and difficult to make the narrowest part of the channel, owing to the land being obscured, especially if neither the Royal Charlotte nor Louisa reefs have been made, and the longitude corrected.

Under these circumstances, it is advisable to proceed with caution, regulating the speed of the vessel so as to be in the fairway, viz., lat.  $8^{\circ}$  N., long.  $116^{\circ} 15'$  E., for making the channel at daylight. Horsburgh recommends lat.  $8^{\circ} 30'$  N., and long.  $116^{\circ} 30'$  E., but this may be running too close at night, unless confident of the accuracy of the reckoning.

If uncertain of the vessel's position, endeavour to get soundings on the edge of the bank north-westward of Balabac island, the safest part to

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\* The directions for the Palawan passage are chiefly by the late Capt. W. T. Bate, R.N. See Admiralty charts :—Palawan island, No. 967, scale,  $m = 0.1$  of an inch; and China sea, No. 2,660b. scale,  $m = 0.05$  of an inch.

approach being about the elbow, on the parallel of  $8^{\circ} 30' N.$ , or immediately to the southward of it, for it is believed that portion of the bank with Balábac peak bearing S.E. by E.  $\frac{1}{2}$  E. to S.S.E., comprising a distance of 25 miles, is free from danger. If the peak be obscured, the same bearings of the body of the island will, if taken with care, answer. Or the north extreme of the island (showing like a hillock, with a low double hill to the southward), bearing East S.S.E.  $\frac{3}{4}$  E.

During the period the *Royalist* was engaged upon this survey, experience led to the belief that in the thickest weather the land is seldom totally obscured for any length of time, but generally shows a well defined outline between the squalls.

Having obtained soundings (which will be about 90 fathoms, if close to the edge of the bank, and from 45 to 55 fathoms sand, if inside), steer to the north-westward, to give the edge a berth of about 10 miles, then steer the channel course N.N.E.  $\frac{3}{4}$  E. When Bulanhow mountain bears eastward of E. by N.  $\frac{1}{2}$  N., the elbow has been passed, and the bank then trends N.E. by N. It is between the elbow and the parallel of  $9^{\circ} 15' N.$  (a distance of 60 miles) on the east, and the Half Moon, Royal Captain, and Bombay shoals on the west, that the most dangerous part of the Palawan passage lies.

When Mantaleengahan mountain bears S.E.  $\frac{1}{2}$  E., or the Pagoda cliff, which is generally seen when the more elevated land is obscured, S.E.  $\frac{1}{2}$  S., the vessel will be on the line of the Bombay shoal, where the channel is 28 miles broad.

Having passed the Bombay shoal, abreast of which the bank trends N.E.  $\frac{1}{2}$  N., steer a course parallel with its edge, preserving a distance of 8 or 12 miles from it, and 27 or 30 miles from the land, or nearer, if convenient, and the peaks on Palawan are sufficiently distinct to get good cross bearings. It is, however, not desirable to get too close, as the edge of the bank in about the parallels of  $9^{\circ} 30'$  and  $10^{\circ} N.$  is not uniform in its outline, and several rocky patches lie within a mile, and in some places only 3 cables from the 100 fathoms line.

This N.E.  $\frac{1}{2}$  N. course, edging a little more to the northward when abreast of Ulugan bay, where the bank extends 28 miles from the shore, will take a vessel through the passage clear of every known danger.

Vessels working through the Palawan passage, having conformed to the directions given for making the south-west end of Palawan, should, in fine weather, endeavour to make their inshore boards in the afternoon, for the sun being then astern of the vessel, the patches lying near the edge of the bank will generally be distinguished from the mast-head in ample time to tack. In squally weather also, during heavy vains, these patches have been observed imparting a yellowish huc to the surface of the water very distinctly.

It is almost needless to remind the seaman (when the land is obscured) of the desirableness of getting soundings on the edge of the bank before

dark, in order that he may have a good departure for the night; and on making his inshore board it must also be borne in mind, that the probability of coming suddenly into soundings is great, as the approach will generally be at right angles to the edge of the bank. He should therefore be prepared to tack immediately on getting the first indication of soundings.

Proceeding northerly from the Palawan passage, it is customary to work up the west coast of Luzon to Piedra point (page 268), and thence direct for Macao or Hong Kong, passing leeward of the Pratas. But if bound to any of the ports northward, much time may be saved by working up through the Babuyan and Batan islands, and along the eastern coast of Formosa, thereby avoiding the heavy labour, wear, and loss of time by the attempt to work against the monsoon along the coast of China, which even a clipper sometimes fails in effecting.

In working along the Luzon coast, particularly about dawn and sunset, less sea, and much lighter winds, will be experienced by hugging the coast by short boards, and at times even land breezes may very much facilitate progress; but in the attempt to render these available, great caution should be observed, particularly between Piedra point and cape Bojeador, as several coastline dangers are said to exist in this locality. H.M.S. *Samarang* met with a dangerous patch in the bay near point Dile, being at the time  $2\frac{1}{2}$  miles off shore, a church bearing E.S.E.

The first strong gust of the monsoon will be experienced on clearing cape Bojeador, but this should not induce the navigator to stand farther westward than is necessary to weather the cape, when less wind will at once be experienced. This generally is the case on all lee shores backed by mountains, either resulting from obstruction, reaction, or the effect probably, after sunset, of counteracting land winds. Among the groups northward of Luzon there are no dangers which are not easily avoided, and no continuous strong breezes will be experienced, at all comparable in force, or attended by high sea, similar to those which prevail between Piedra point and Hong Kong. On the contrary, good working breezes, and at times light winds prevail, enabling a well-conditioned sailing vessel to make the range of 6 degrees northing in 8 days. Typhoons are likely to occur in both monsoons between the north coast of Luzon and Formosa.

### **Hong Kong to Singapore in North-east Monsoon.\*—**

Vessels with full steam power should, on leaving Hong Kong, steer to pass about 30 miles west of Paracel islands and reefs, 15 or 20 miles east of cape Varela, and 10 miles east of Pulo Sapatu, thence to Pulo Aor, and Singapore strait.† Sailing vessels bound from China to Singapore, or to Gaspar or Banka straits, should in March and April adopt the Main route by the Macclesfield bank, which is the most expeditious in these months, keeping to the eastward on leaving the China coast; and in passing Pulo Sapatu

\* Principally from Horsburgh.

† Mr. E. M. Edmond, R.N.R., 1879.



should borrow to the eastward towards the shoals, where the winds are more favourable than farther to the westward. In April the *Vansittart* by keeping about 3 degrees more to the eastward than the *Herefordshire*, made as much progress in one day as the latter did in ten: At all other times, the Inner route by the coast of Cochin China seems preferable; for it is the shorter, and the ease afforded by steering from the Grand Ladrone immediately before the wind, when blowing strong at N.E., is a great advantage: whereas by the Main route, a S.S.E. course is shaped for the Macclesfield bank, often bringing the wind and sea before the beam, which strains a deeply-laden vessel. Many have strained so much, that, in order to gain upon the pumps, they were forced to bear away for the Inner route; others, by persevering in the Main route, have laboured excessively, and some of them at last foundered with their crews. Some of the vessels which, after leaving China, have been missing, have probably suffered from the same cause. Had those vessels, on leaving Canton river, steered S.S.W.  $\frac{1}{2}$  W. or S.S.W.  $\frac{1}{4}$  W., the direct course for the Inner route, they probably would not have strained in the least, but have reached their ports of destination in safety.

Vessels may, according to circumstances, pass either to the eastward or westward of the Catwick islands and Pulo Ceicer de Mer, or through any of the channels between them; it would seem advisable, in thick weather, to pass 20 or 30 miles eastward of Pulo Sapatu, especially at night, thence westward of the Charlotte bank and the Anamba islands, steer to make Pulo Aor.

Should the weather be thick, and a fresh breeze blowing, when near Pulo Aor, round to under its lee, and wait a convenient time to bear up for the strait.\* The current between this island and the east point of Bintang sets about S.S.E., by which it often happens that vessels leaving Pulo Aor steer too much southerly, and are swept with the current and the ebb tide coming out of the strait, so far to leeward of Bintang, that they have been obliged to proceed round it, and come up through Rhio strait.

In March, during the latter part of this moonson, the winds are steady from the eastward, the weather settled, and the current weak. In April the prevailing winds are also from the eastward, but are much lighter and accompanied with calms and squally weather; from the latter end of this month to about the middle of May the monsoon gradually breaks up.

### **Hong Kong to Singapore in South-west Monsoon.—**

Vessels with full steam power after leaving Hong Kong, and passing about 30 miles west of Paracel islands and reefs, should steer to make the land in the vicinity of Pulo Cauton, keeping about 3 miles off shore as far as cape Padaran, when a course should be steered to pass about 3 miles east of Pulo Aor, thence to Singapore strait.

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\* Since the establishment of Horsburgh light, on Pedra Branca, there is really now no difficulty in making Singapore strait at any time, with proper attention.

At night in tolerably clear weather a vessel may pass near to Pulo Ceicer de Mer, westward of the Catwicks and Pulo Sapatu, thence to Pulo Aor. During thick weather it is advisable to pass eastward of Pulo Sapatu.\*

Captain Blake, of H.M.S. *Larne*, adding to his own experience that of several commanders of the opium clippers, gives the following remarks :—

Although formerly considered impracticable, it is now a common practice for sailing vessels to work down the China sea at all periods of the south-west monsoon. After leaving Hong Kong, the usual course is to stand towards Hainan, which will be often fetched without tacking, as the wind frequently blows for days together from the south-east or eastward in that part of the China sea; from thence across Tong King gulf to the Cochin China coast. Land and sea breezes and smooth water generally prevail close to that coast, for which reason it is usual to work down as close to the shore as possible, taking advantage of every slant of wind, but being careful not to get too far off the land. It is sometimes possible to get as far to the southward as cape Padaran in this way, but generally after passing cape Varela the monsoon is found blowing very fresh, with frequent hard squalls out of the gulf of Siam, rendering it impossible to work much to windward. From cape Varela, or from cape Padaran if a vessel has been able to fetch it, stretch away to the southward—making a tack if necessary, to weather the West London or other shoals—till the coast of Borneo is reached, along which work, and pass out through any of the South Natuna channels. Stand across to Singapore, keeping well to the southward before closing Bintang, to be sure of your landfall, as the currents run very strong, sometimes 2 miles an hour to the northward (see page 19).

**Singapore to Gulf of Siam and to Saïgon in North-east Monsoon.**—Sailing vessels bound from Singapore to the gulf of Siam in the north-east monsoon generally pass eastward of the Natuna islands. Fast sailing vessels proceed between the Anamba and Natuna islands, endeavour to make Pulo Obi; and then steer for Pulo Dāmā if bound to Kamput, in the gulf of Siam; or outside Pulo Panjang and Pulo Way, direct for cape Liant, if bound to Bangkok. In February and March vessels frequently fall in with an easterly wind off Pulo Aor, that takes them to Pulo Obi.†

The directions given in page 9 for proceeding from Singapore to Hong Kong apply also to vessels bound to the gulf of Siam or to Saïgon, until they have arrived to the eastward of the Natuna islands, either by passing between the Great and South Natuna, or by the Koti passage, when—

**If bound to the Gulf of Siam** proceed to the north-eastward to about long. 111° or 112° E., which can easily be done, as the wind is

\* Mr. E. M. Edmond, R.N.R., 1879.

† The Directions from Singapore to Saïgon, and from Saïgon to Singapore, are chiefly by Mr. A. J. Loftus, commanding the ship *Kensington*.

invariably from North to N.N.W. as far as the meridian of cape Sirik, when it generally veers to the north-eastward; thence towards Pulo Obi. Little or no current will be experienced until lat  $6^{\circ}$  or  $7^{\circ}$  N. is gained; when it will be found setting strong to the south-west, governed considerably by the prevailing winds.

In April and May the best passages to the gulf of Siam are made by keeping the Malay coast aboard; but except squalls, calms, and rain; the current will also begin to set weakly to the N.E.\*

**If bound to Saigon** proceed north-eastward to about  $112^{\circ}$  E thence to make cape Tiwane. From lat.  $7^{\circ}$  N. until the mouths of the Cambodia rivers bear East, distant about 70 miles, strong currents will be found setting to the south-west governed considerably by the prevailing winds, for when strong gales blow in the early part of this monsoon, the south-westerly current is stronger, and often runs 3 knots an hour. The tides are regular, and set strong in shore on the Cochin China coast during both monsoons.

In the latter part of March and April an easterly wind is often found eastward of the Anamba islands, that will take a vessel to Pulo Condore; thence work to cape St. James westward of that island, keeping close to the Cambodia coast, which is very low, and can seldom be seen at night.

After opening out the mouths of the Cambodia rivers, strong ebbs will be found setting to windward, greatly assisting vessels standing inshore; but they should not stand near these mouths during the flood tide, and on no account shoal the water to less than 12 fathoms in the night. The lead should never be neglected when standing towards this low land, which may be seen from a distance of about 10 miles in clear weather.

N.E. and N.N.E. gales often blow in the latitude of Pulo Sapatu, and between it and the Cochin China coast, in December, January, February, and sometimes March; they continue for two or three days with a heavy sea and strong current. A gradual rise in the barometer is a sure indication of one of these gales; while at their height the mercury fluctuates about  $\frac{1.5}{100}$  of an inch during the twenty-four hours, and commences falling before the gale is over, the sky being generally thick and hazy throughout.

After sighting the land, the vessel should gain the meridian of cape St. James in one of these gales, bear up for Pulo Condore, and anchor either in the Great bay, or in Pulo Condore harbour, where good shelter will be found; otherwise the vessel will be drifted to leeward of that island, and require several days to regain her former position.

**Singapore to Gulf of Siam and to Saigon in South-west Monsoon.**—In this monsoon the winds prevail between S.E.

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† Mr. J. Richards, Master R.N., 1858.

and West in Singapore strait, and vessels will have no difficulty in sailing through to the eastward.

**If bound to the Gulf of Siam**, having cleared Singapore strait, shape a course to make the Redang islands ; and thence keep the western shore of the gulf aboard, passing inside Pulo Lozin and Koh Krah.

**If bound to Saïgon**, steer to pass to the westward of Pulo Condore, making allowance for a current setting out of the gulf of Siam, whilst crossing the entrance of that gulf. When Pulo Condore bears about South, steer North, or N.  $\frac{1}{2}$  W. if an easterly current prevail ; which will bring the vessel on the edge of the bank that fronts the mouth of the Cambodia rivers, and extends to the entrance of Saïgon river. Steer thence northward along the edge of the bank, keeping in 8 to 12 fathoms ; if the water shoals under 7 or 8 fathoms steer to the eastward, and it will immediately deepen, the soundings being regular on the edge of the bank.

Directions for making the land about cape St. James and for proceeding up the Donnai river to Saïgon, are given at page 339.

**Gulf of Siam to Singapore in North-east Monsoon.\***

—From Bangkok, the passage down the gulf will frequently be shortened in the north-east monsoon, by sighting the Kusrovie rock, and passing between the Tanqualah group and Koh Tron. Keep well to the eastward of Pulo Panjang, and if bound to Singapore the passage will be made quicker by steering well out into the China sea ; passing about 20 miles outside Pulo Brala, outside Pulo Aor, and then steering for Barbukit hill, so as to allow for the southerly current setting across the strait.

Approaching Pulo Timoan at night or in thick weather, a good look-out should be kept and allowance made for the current setting to the south-westward ; as vessels have several times been found close to the north end of that island when the reckoning has placed them well to the eastward of it.

**Gulf of Siam to Singapore in South-west Monsoon.\***

—From Bangkok to Singapore keep the western shore of the gulf of Siam aboard, passing inside the Redang islands, Pulo Kapas, and Pulo Brala. Southward of Pulo Kapas, keep in shore out of the current, and taking advantage of the land and sea breezes.

**Saïgon to Singapore in North-east Monsoon.**—From cape St. James shape a course to pass eastward of Pulo Condore, and thence direct to make Pulo Aor. From Pulo Aor to Singapore proceed according to directions previously given.

**Saïgon to Singapore in South-west Monsoon.†**—Many good passages have been made by keeping the Cambodia coast aboard as far the Brothers or Pulo Obi, and then crossing the gulf of Siam with a strong north-westerly wind until the Malay coast is reached, and afterwards working with the tides, keeping close in shore, by passing

\* Mr. J. Richards, Master R.N., 1858. † Mr. Loftus.

inside of the Timoan group, Siribuat, and Pulo Sibn,\* and thence to the strait of Singapore, taking advantage of the regular tides and the land and sea breezes which prevail during settled weather in this monsoon.

This route is generally adopted from Siam and sometimes from Saigon ; but the passage eastward of the Great Natuna is considered the best, particularly for large vessels.

Vessels leaving cape St. James should take every advantage of the North and N.E. winds, which frequently blow at night, and in some parts of the day, within a short distance of the coast, by running to the south-westward until the regular monsoon breaks them off to the S.E. These local winds often carry vessels 40 or 50 miles south-westward of Pulo Condore without any interruption.

While standing to the S.E. the full strength of the north-easterly current will be met with about the Charlotte bank ; it gradually decreases and becomes slightly favourable when the Great Natuna bears S.W. In this locality S.E. and Easterly winds will generally be met with, and fast sailing vessels frequently pass through the channel between Subi and Low island, and into Singapore Strait.

Strong westerly winds with rain frequently happen during the early part of this monsoon, and from this cause or by proceeding  $2^{\circ}$  or  $3^{\circ}$  eastward of the Great Natuna with scant southerly winds after leaving the Cambodia coast, dull sailing vessels have often made the northern part of Borneo about the meridian of cape Sirik. When this is the case, make for the Api passage, keeping the north-west coast of Borneo aboard from Tanjong Datu until the Boerong islands are reached.† This will be accomplished without difficulty, for strong land and sea breezes prevail, and the current is weaker near the coast.

The current in the offing runs strong to the northward and through the Api passage. Vessels coming through this passage should not shoal to less than 12 or 14 fathoms water between Tanjong Datu and Tanjong Api, nor pass these points nearer than 2 or 3 miles, and should be ready to anchor in it or off any other part of the coast, as the tides are greatly influenced by the currents, which often change without warning.

Leaving the Boerong islands, pass either northward or southward of the Tambelan group. Should the wind be scant from the S.W. after leaving these islands, endeavour to make Pulo Panjang, off the east side of Bintang island.

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\* The inside channel extending from Pulo Sibn to Siribuat, and formed by a chain of islands and rocks parallel to the main, is a good and safe one, having but a few hidden dangers, and good anchorage all the way through.

† Many vessels, through leaving the coast of Borneo too soon have fetched no higher than Pulo Aor or Pulo Timoan.

## CHAPTER II.

## SOUTHERN PART OF THE CHINA SEA.

WEST COAST OF BORNEO; MASIEN TIEGA ISLETS TO TANJONG API.—  
ISLANDS AND DANGERS BETWEEN BORNEO AND SINGAPORE  
STRAIT.

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VARIATION at the Tambelan islands,  $1^{\circ} 30'$  East in 1879.

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**The WEST COAST of BORNEO**, from a point about 5 miles northward of the Masién Tiega islets, trends in a northerly direction for a distance of 55 miles, to the Pontianak river. Two or three small islands are shown on the chart as lying close to this part of the coast, and the entrance of the Sanggaw, one of the branches of the Pontianak, is about 15 miles to the southward of the main entrance. The following remarkable phenomenon was experienced by Captain Pearson, of the brig *Lady of the Lake*, in the months of May and June, while sailing along this coast on two different voyages :—

“June 2nd, 1833, at daylight, when sailing along the coast in 10 fathoms water, experienced a singular incident; fresh water on one side the vessel, and salt water on the other, which continued for an hour whilst sailing about 2 miles on the boundary-line of salt and fresh water. We filled all our empty casks with good drinkable water on one side of the vessel, when it was quite salt on the opposite side; our then distance  $2\frac{1}{2}$  or 3 miles off shore, lat.  $0^{\circ} 8' S.$ , with the appearance of the mouth of a great river abreast, which must be navigable for large vessels, as the water deepened in crossing its direction.” This was probably the Sanggaw river, one of the branches of the Pontianak, several of which reach the sea between the equator and latitude  $0^{\circ} 20' S.$

**PONTIANAK RIVER** entrance is in lat.  $0^{\circ} 2' N.$ , long.  $109^{\circ} 12' E.$  and distance 35 miles E.  $\frac{3}{4}$  S., from Pulo Datu. The anchorage\* in the road is in  $3\frac{1}{2}$  to  $5\frac{1}{2}$  fathoms, with the river's mouth bearing E. by S.  $\frac{1}{2}$  S. or E.S.E., Pulo Datu W.  $\frac{1}{4}$  N. or W.  $\frac{1}{2}$  N., and the extremes of Borneo from S.  $\frac{1}{4}$  E. to N.N.W.  $\frac{1}{2}$  W., off shore about 4 or 5 miles. The ship *Princess Charlotte of Wales*, June 1st, 1813, anchored in  $5\frac{1}{2}$  fathoms, with the extremes of the land from N.N.E. to S. by W., the entrance of the river E.N.E., off shore 5 or 6 miles, observed lat.  $0^{\circ} 1' N.$  A shoal mud-bank projects some distance from the mouth of the river, and although the bar is nearly dry at low water, there are 8 or 10 feet on it at high spring tides. The town is about 12 miles from the entrance, and has a fort; and and at Balu Lagong, about 7 miles up, there is a fort on each side. These two places are sometimes visited by Bengal traders.

Pontianak is one of the principal stations of the Dutch, who now rule this part of the coast. There is a considerable trade with Batavia and Singapore, but it is almost entirely carried on by native vessels. The river is said to be navigable for a distance of 200 miles.

**Buoys.**—A white buoy is moored in 18 feet on the south side of Pontianak river entrance, with Pulo Datu bearing W.  $\frac{1}{4}$  N.; and Pulo Temadjoe N.N.W.  $\frac{1}{2}$  W.; and a black buoy in 17 feet on the north side with Pulo Datu West northerly; and Pulo Temadjoe N.N.W.  $\frac{3}{4}$  W.

**Supplies.**—Bullocks and hogs may be procured at Pontianak, and also at Mampawa; but boats must go far up the Pontianak to procure fresh water during the dry season, which makes watering at this river very inconvenient.

**TANJONG MAMPAWA** is in lat,  $0^{\circ} 21' N.$ , long.  $109^{\circ} 54' E.$ , and bears N.W. 23 miles from the entrance of the Pontianak, the coast between forming a bay. About 4 miles eastward of the point is Mampawa river, which is only navigable for proas; there is a fort at the town of Mampawa, a few miles inside the entrance. The anchorage in the road is in 5 to 8 fathoms, about 3 or 4 miles off shore, with the mouth of the river N. by E.  $\frac{1}{2}$  E.; or to the westward of the point at discretion, bearing in mind that the soundings decrease rather suddenly under a depth of 10 fathoms.

H.M.S. *Rifleman*, in 1862, anchored off Mampawa point, but could not find the landing place mentioned in Horsburgh as being there. Her boats went up to the town of Mampawa, and succeeded in obtaining a few fowls and eggs.

**The Tides** in Mampawa road run about 2 miles per hour, nearly E.S.E. and W.N.W.

**The COAST** from Mampawa point trends nearly N. by W. for 28 miles, to Tanjong Batoe Belad. At 9 miles from Tanjong Mampawa is Tanjong Sangouw, between which is a bay about 2 miles deep, with a small round islet\* in the depth of it. At 13 miles northward from Tanjong Sangouw, and about half a mile from the shore lies Pulo Samassu with Kran islet about a quarter of a mile N.W.  $\frac{1}{2}$  N. from its north extreme. On either side of the point abreast Pulo Samassu the coast line recedes, forming bays, towards which the soundings decrease gradually.

**Mountains.**—Between Pontianak river and Tanjong Batoe Belad there are many remarkable mountains, some rising boldly near the sea, and others several miles inshore. A long continuous range extends eastward from Tanjong Sedau Malang (5 miles north-eastward of Tanjong Batoe Belad) for a distance of 12 or 13 miles.

\* The western part of this islet was used as an observation spot by the *Rifleman*, and its position was ascertained to be in lat.  $0^{\circ} 24' N.$ , long.  $108^{\circ} 56' E.$

**Pulo Sitenga**, in lat.  $0^{\circ} 23' N.$ , long.  $108^{\circ} 43' 40'' E.$ , is three-quarters of a mile long N.N.E. and S.S.W., nearly half a mile broad, and moderately elevated, having close around 6 to 8 fathoms water, and 11 to 16 fathoms, clay bottom, at a short distance.

**Pulo Damar**, lying N.E.  $\frac{3}{4}$  E.,  $2\frac{3}{4}$  miles from Sitenga, is a small round islet, moderately elevated and covered with large trees. Close around it are  $5\frac{1}{2}$  to 8 fathoms, increasing to 10 and 14 fathoms at a short distance to the westward.

**Pulo Temadjoe**, lying about  $2\frac{1}{2}$  miles westward of Tanjong Sagouw, is about  $2\frac{1}{2}$  miles long north and south,  $1\frac{1}{2}$  miles broad, considerably elevated, and of an irregular shape. On its north-west side are two small bays with white sandy beaches; there is also a rather deep bay on its west side.

The soundings decrease gradually towards Temadjoe, from 14 and 12 fathoms to 7 and 6, with 4 and 3 fathoms close to, except on its east side, where a reef appears to project about a quarter of a mile. The channel between the island and the mainland is clear, with depths of 7 or 8 fathoms, decreasing regularly towards the main, and there is good anchorage under the lee of the island during the north-east monsoon.

**Pulo Baroe**, in lat.  $0' 37'' N.$ , long.  $108^{\circ} 44' E.$ , is only about a third of a mile in extent with a shoal of 9 feet close to its north extreme. The soundings are very irregular, there being 18 to 5 fathoms, close to.

**A Shoal** with 16 feet water, and 12 to 16 fathoms around, lies half a mile N.N.W. from Pulo Baroe.

**Pulo Samassu**, situated 10 miles north from Pulo Temadjoe, and some distance inside the 3-fathoms edge of the bank extending from the shore, is three-quarters of a mile long N. by W. and S. by E., and a quarter of a mile broad. The soundings decrease rather suddenly towards this island, which should not be neared under a depth of 8 or 6 fathoms.

**Four-Fathom Shoal**.—A shoal with 4 fathoms over it, and 8 to 11 fathoms around, lies with the south point of Pulo Samassu bearing East, distant  $3\frac{1}{2}$  miles; and the west part of Pulo Kaboen, shut in with the north-east part of Pulo Penata Ketchil, N. by W.-westerly.

**BOERONG ISLANDS** are a group of five islands lying westward of Tanjong Batoe Belad and the coast adjacent to it.

**Pulo Landean**, the southernmost of the group, is an islet, barely a quarter of a mile in diameter, lying about three-quarters of a mile S. by E. from the south point of Lamokatan, having near it depths of 4 fathoms, and 10 to 12 fathoms at a short distance westward.

**Pulo Lamokatan**, the largest island of the group, is  $4\frac{1}{2}$  miles long N.N.W. and S.S.E., a little over a mile broad. This island is high, with several peaked hills. There are 15 fathoms water close to its west side, and apparently a deep channel between it and Pulo Landean. Shoal



water extends about a quarter of a mile from the north part of Pulo Lamokatan.

There is anchorage in 5 or 6 fathoms abreast two small bays on the east side of Lamokatan, but it will be necessary to approach the shore with caution, the soundings decreasing rather suddenly from 17 or 16 fathoms.

**Pulo Penata Besar**, 2 miles long N. by W. and S. by E., and two-thirds of a mile broad, lies about  $1\frac{3}{4}$  miles eastward of Pulo Lamokatan, the south extremes of both islands being in the same latitude. Close to the east and west sides of Penata Besar there are 4 to 8 fathoms water, except off its north point, where there are but 10 feet. In the channel between these islands there are 22 to 33 fathoms, decreasing to 15 and 14 fathoms northward of Pulo Penata Besar.

**Pulo Penata Ketchil**, situated a mile eastward of Penata Besar, is about half a mile in extent, with 8 to 13 fathoms close to. A point projects in a south-easterly direction from the island, upon each side is a small bay. At half a mile southward of Pulo Penata Ketchil there is a patch of 4 fathoms with 6 and 7 fathoms close to.

**A shoal**, over which the least water appears to be  $3\frac{1}{4}$  fathoms, lies about one-third of a mile N.N.W. from the north point of Pulo Penata Ketchil, and extends about N.  $\frac{1}{2}$  E.  $1\frac{1}{2}$  miles. Close to the west side of this shoal there are 7 to 16 fathoms, but on the east side soundings of 5 fathoms extend nearly a mile from it, when the depths suddenly increase to 12 and 19 fathoms.

Caution is necessary when crossing or passing near this bank, as it is not certain that the least water has been obtained.

**Pulo Kaboen**, the north-east island of the group, situated E.N.E. about 4 miles from the north end of Lamokatan, and W. by N.  $\frac{1}{2}$  N. nearly 3 miles from Tanjong Batoe Belad, is high, about  $1\frac{1}{2}$  miles long, N. E. by N. and S.W. by S., and one mile broad, with 6 to 8 fathoms close to, except near its south end where there are  $3\frac{1}{4}$  fathoms, with 4 fathoms about three-quarters of a mile from it. A patch of 4 fathoms lies about half a mile off the north-west point of Pulo Kaboen.

**TANJONG BATOE BELAD**, the westernmost extreme of Borneo, is in lat.  $0^{\circ} 49' N.$ , long.  $108^{\circ} 49' 30'' E.$  The point appears low, with three hills immediately behind it, and a range of hills, and extending 12 or 13 miles to the eastward; some rocks lie off it within the 3 fathoms line of soundings which is nearly half a mile from the shore.

**A Shoal** of small extent, with  $2\frac{3}{4}$  fathoms water, and 11 fathoms close around, lies N.W.  $\frac{1}{2}$  N.  $1\frac{1}{2}$  miles from Tanjong Batoe Belad, and West southerly from the north point of Pulo Kaboen, there are 8 or 9 fathoms water between it and the shore bank, and 12 to 15 fathoms between it and Pulo Kaboen.

**The Channel** between the Boerong islands and the main has depths of 8 to 11 fathoms, in the southern, and 12 to 18 fathoms in the northern part; the depths do not decrease so regularly towards Tanjong Batoe Belad as at other parts of the channel, for about a third of a mile from the edge of the shore bank there are 13 fathoms, decreasing suddenly to 8 and 4 fathoms.

**Directions.**—It will frequently be found convenient to keep tolerably close to the coast of Borneo, just described, especially when working to windward against the north-east monsoon, as favourable tides will be found near the shore when a strong current is running to the southward some distance from it. Between the Masien Tiega islets and Tanjong Mampawa, a vessel may stand towards the coast, guided by the lead, into 7 or 6 fathoms; farther out, between the Greig shoal and Pulo Datu, the depths are 18 or 20 fathoms. Small vessels may pass in safety between Pulo Temadjoe and the main, the channel being a mile wide with depths of 7 and 8 fathoms; large vessels, however, had better pass outside that island. Between Temadjoe and Samassu vessels of any size may stand towards the coast into 7 or 6 fathoms, and pass on either side of Baroe island and the shoal near it as convenient. The Boerong islands may be boldly approached from the westward, and large vessels had better pass outside them; but small vessels may often with great advantage pass inside, taking care to avoid the  $3\frac{1}{4}$  fathoms shoal to the northward of Pulo Penata Ketchil, and the  $2\frac{3}{4}$  fathoms patch about  $1\frac{1}{2}$  miles north-west of Tanjong Batoe Belad.

**The COAST** from Tanjong Batoe Belad trends in a north-easterly direction for about 5 miles to Tanjong Sedau Malang, where it recedes to the eastward for 2 or 3 miles, thence in a N.N.W. direction, 18 miles to Biela point, the southern entrance point to Sambas river.

Several rivers disembogue upon this part of the coast, the most important of which are the Singkawang, about 5 miles north of Tanjong Sedau Malang, and the Slakouw, about two-thirds of the distance between Tanjong Sedau Malang, and Biela point. The town of Singkawang, situated some miles up the Singkawang river, is the principal military station of the Dutch upon this coast, and there are usually about 500 soldiers, Europeans and natives, quartered there.

**Shoal Patch.**—The soundings along this part of the coast appear to decrease regularly towards the shore, except on a shoal patch which lies S.S.W.  $\frac{3}{4}$  W. from Biela point, and nearly West, distant 5 miles from the entrance of the Slakouw river; upon this patch, which is just inside the edge of the 5 fathoms line, there are only  $2\frac{1}{2}$  fathoms water.

**SAMBAS or GREAT SAMBANG RIVER** has a wide entrance, in lat  $1^{\circ} 11' N.$ , long.  $108^{\circ} 55' E.$ , with some small islets close to the north point, and two hills on the south point. The town is about 30 miles up

the river on the south branch, which has many windings near the town. The principal branch is wide, runs in an easterly direction and has several lateral branches. The sea flowing into the river makes the water brackish 13 or 14 miles up. The anchorage in the road is with the mouth of the river bearing East or E.  $\frac{1}{2}$  N., in any convenient depth, from 15 to 5 fathoms, the decrease being regular over a soft bottom to 4 fathoms about  $1\frac{1}{2}$  or 2 miles off shore; the soundings are regular along this part of the coast.

Sambas is one of the places on the Borneo coast formerly visited by vessels employed in the eastern trade from Bengal; it was fortified by a piratical rajah, who was driven to the interior by a British force sent from Batavia in 1812. Since the late treaty with the Netherlands government, the Dutch have claimed as their right most of the trading ports along this coast, where they have placed commercial residents and troops.

**The COAST** from Great Sambas river trends in a gradual curve to Tanjong Pajoeng, or Somoet, which bears from Biela point N.N.E.—northerly, 25 miles. The soundings off it decrease gradually towards the shore from 17 or 16 to 8 and 4 fathoms; but shoal water extends more than  $1\frac{1}{2}$  miles from Tanjong Pajoeng.

From Tanjong Pajoeng the coast recedes 2 or 3 miles to the eastward, then trends north-eastward 13 or 14 miles to the entrance of Palo river, from the north point of which the land curves to the northward to Tanjong Api (page 85), forming a small bay. The coast between Tanjongs Pajoeng and Api has not been thoroughly examined, and must be approached with great caution, as shoal banks appear to extend 6 or 7 miles from it.

#### ISLANDS AND DANGERS BETWEEN BORNEO AND SINGAPORE STRAIT.

**Pulo Datu**, 1,042 feet high, situated W.  $\frac{3}{4}$  N. 35 miles from Pontianak river entrance and S.W. by W. 21 miles from Tanjong Mampawa, is  $1\frac{1}{2}$  miles long, N.E. and S.W., and three-quarters of a mile broad, with 6 to 14 fathoms close to. At one mile westward of the island there are 16 to 19 fathoms water, and one mile eastward 29 to 30 fathoms.

**Direction Island**, or Pulo Paneeky Ketchil, 639 feet high, lies W.  $\frac{3}{4}$  N. 32 miles from Pulo Datu. A small island lies nearly half a mile off the south-east extreme of Direction island, with depths of 10 to 17 fathoms in the channel between. The soundings around these islands are irregular, there being 14 to 20 fathoms within a distance of 3 miles.

**ST. BARBE ISLAND**, or Pulo Paneeky Besar, 762 feet high, situated W. by S. 47 miles from Direction island, is about 3 miles long, and when first seen appears like two or three islands, being lower at the centre than at the north-east and west parts.

The south point of the island is clifty and bold, but a reef fills up the first bay on its east side; in the large bay to the northward the shore reef does not extend so far out. The west side of the island is divided into two small bays, having reefs in them near the shore. Off the north-west point of the island are two or three small rocks a few feet above water, and a reef projects about a quarter of a mile from the point to the northward of it. A small rock above water lies near the middle of the large bay on the north side of the island, and a third of a mile north of this rock is another sometimes awash, with 10 and 17 fathoms close to. A small rock above water also lies close to the east side of the north point of the island.

The soundings near this island are also irregular, 19 to 26 fathoms southward, 18 to 27 fathoms eastward, 26 to 35 and 40 fathoms westward, and 17 to 24 fathoms northward; close to the east side of the north point are 27 to 35 fathoms.

**Water and Wood** may be procured in a bay on the east side of the north-west point of St. Barbe, and also near the south-east point; as the shore is fronted by a reef, boats can only land at high tide, at which time fresh water may be rafted off. Water may also be obtained from the bay at the north point of the island, abreast of which is the best anchorage in the southerly monsoon.

**WELSTEAD SHOAL**, in lat.  $0^{\circ} 32' N.$ , long.  $107^{\circ} 53' E.$  was discovered in 1825 by Mr. G. Welstead commanding the ship *General Harris*, which grazed over it.

The shoal which is half a mile long E.N.E. and W.S.W. and about a cable broad, consists of a number of pinnacle rocks, with depths of 7 to 3 fathoms, and 17 to 23 fathoms close around. From the *Rifleman* when at anchor on the shoal, Direction island bore S.S.E.  $\frac{1}{2}$  E., and Tambelan peak N.W.  $\frac{3}{4}$  N.

**EBELING SHOAL**.—Mr. Ebeling, commanding the Chilian ship *Mercedo*, in 1863, reported having sounded in  $4\frac{1}{2}$  fathoms upon a coral shoal, and whilst the lead was being hauled in the vessel passed over one side of a patch upon which there appeared to be as little as 16 or 18 feet water. The bearings given were:—St. Barbe island S.  $28^{\circ}$  W., middle of St. Esprit group N.  $79^{\circ}$  W., Pulo Gigang, or Jarrang (Tambelan group) N.  $14^{\circ}$  E., which places the shoal in lat.  $0^{\circ} 31' N.$ , long.  $107^{\circ} 26' E.$

**The ST. ESPRIT GROUP**, or Atas islands, consists of several small high islands and islets, extending about 12 or 13 miles in a W.N.W. and E.S.E. direction, between the parallels of  $0^{\circ} 31'$  and  $0^{\circ} 39' N.$ , and the meridians of  $106^{\circ} 58'$  and  $107^{\circ} 11' E.$ ; between the islands are deep and generally clear channels.

**S.E. Island**, 145 feet high in lat.  $0^{\circ} 30\frac{3}{4}'$  N., long.  $107^{\circ} 8\frac{1}{2}'$  E., is a quarter of a mile in extent, and connected by a reef to a low white rock which lies a quarter of a mile northward of it. Close to the island the soundings are irregular, 14 to 32 fathoms; between it and the Brace islands the depths are also irregular, 24 to 33 fathoms, with a patch of 11 fathoms about  $1\frac{1}{4}$  miles from S.E. island. Between S.E. island and the large island next west of the Brace islands the depths are more regular, 28 to 30 fathoms.

**S.W. Island**, 305 feet high, in lat.  $0^{\circ} 33\frac{1}{4}'$  N., long.  $106^{\circ} 58\frac{1}{4}'$  E., is small, and apparently steep to; close to the southward of it are soundings of 30 to 34 fathoms.

**Howqua Shoal** is a doubtful danger said to lie 4 miles S.  $\frac{3}{4}$  W. from S.W. island. It was unsuccessfully searched for in the *Rifleman*, which steamed over and about its reported position for a whole day; the soundings in the vicinity are from 31 to 36 fathoms.

**Brace Islands** comprise two small islands, about three-quarters of a mile apart, and a larger island 572 feet high, a mile north-west of them. The easternmost Brace island, which is the easternmost of St. Esprit group, is in lat.  $0^{\circ} 33\frac{3}{4}'$  N., long.,  $107^{\circ} 10\frac{3}{4}'$  E. Some rocks extend a short distance in a north-east direction from the middle island; the others are steep close to, with soundings of 23 to 33 fathoms at a short distance from them. The channels between these islands are also deep and clear.

**A shoal**, with 3 fathoms water, and 7 to 8 fathoms close around, lies about half a mile W.S.W. from the northernmost Brace island.

**Round island**, 311 feet high, lies about 3 miles westward of the northernmost Brace island; and about a mile westward of Round island lies an island about one mile in extent; there appears to be deep water around and close to these islands.

**Head island**, 372 feet high, situated near the centre of the group, N.W. by N.  $1\frac{1}{2}$  miles from Round island, is an irregular-shaped island, the north side forms a bay, and the east and west sides terminate in a point at the south extreme of the island, in lat.  $0^{\circ} 35' 45''$  N., long.  $107^{\circ} 4' 37''$  E. The channels on either side of Head island appear to be clear of danger, and to have 35 to 45 fathoms water.

**Royalist rock**, with less than 6 feet water, and 38 to 40 fathoms close to, lies with the north-east extreme of Head island, bearing S.S.W.  $\frac{1}{2}$  W., distant a mile, and the apex of the northern Brace island S.E. by E.  $\frac{1}{4}$  E., a little over 4 miles.

**Centre island**, 169 feet high, is small and round lying W. by N.  $\frac{1}{2}$  N.  $2\frac{3}{4}$  miles from Head island, and about two-thirds of a mile from the south-east extreme of the largest island of the St. Esprit group. It appears

to be surrounded to a short distance by a reef, close to which are 30 fathoms water.

The largest and northernmost island of the St. Esprit group is 825 feet high,  $1\frac{1}{4}$  miles long north and south, and three-quarters of a mile broad. It is nearly surrounded at a short distance by a reef, close to which are 25 to 60 fathoms water.

**Bush island**, 393 feet high, the westernmost of the group, lies about W.S.W. 2 miles from the largest island. An islet lies a short distant southward of Bush island, and some islets and rocks lie close to its east extreme; an islet, 110 feet high, named Clump, lies about half a mile northward of its north point. The channel between the largest island of the group and Bush island appears free from danger, with 25 to 50 fathoms water.

**Discoloured water**, having the appearance of a shoal, was seen from the German ship *Rebecca*, 1875, in lat.  $0^{\circ} 30' N.$ , long.  $106^{\circ} 38' E.$

**GREEN ISLAND**, in lat.  $0^{\circ} 44' 43'' N.$ , long.  $107^{\circ} 18' 52'' E.$  is about a third of a mile in extent, covered with trees, has a white sandy beach, and is surrounded at a short distance by a reef, having 17 to 32 fathoms close to.

**RODGER ROCK**, on which the ship *Ellen*, commanded by Mr. Alex. Rodger, struck in 1845, is about 100 yards square, with 3 feet on it. From the centre of the rock Tambelan peak is seen over the summit of Pulo Gigang, or Jarrang, bearing N.  $\frac{1}{4}$  E.; Green island W. by N.  $\frac{1}{4}$  N.,  $12\frac{1}{4}$  miles; the eastern extreme of the Tambelan group N. by E.; and the western extreme N.N.W.  $\frac{1}{2}$  W.

This is an exceedingly dangerous rock, as there are regular soundings of 19 to 22 fathoms close to and at a distance of 2 or 3 miles around. The *Rifleman* was steaming in the vicinity of this rock for four days when it was ultimately discovered by the weather tide causing a slight ripple.

**White Rock**, about 80 feet high, lies E. by S. 5 miles from the south end of Gigang Besar or Jarrang island, the southernmost island of the Tambelan group, and on its south-west side are two small pinnacle rocks about 12 feet high; foul ground extends 2 cables from White rock in directions between N.W. and S.W., the soundings near being 17 to 35 fathoms.

**TAMBELAN ISLANDS** lie about 27 miles to the north-eastward of the St. Esprit group, between the parallels of  $0^{\circ} 52'$  and  $1^{\circ} 7' N.$ , and the meridians of  $107^{\circ} 21'$  and  $107^{\circ} 35\frac{1}{2}' E.$  They comprise a considerable number of islands, and form two groups, each extending N.W. and S.E. about 13 or 14 miles.\*

**South-western Group.**—Gigang Besar or Jarrang, the most south-eastern island of this group, is  $1\frac{1}{4}$  miles north and south, two-thirds

\* See Admiralty chart.—Tambelan islands, No. 361, scale  $m =$  one inch.

of a mile broad, and is bordered at a short distance by a reef. It is a high island, rising to a peaked hill in the centre, and having a lower peak near each extreme. Gigang Ketchil, an island about a quarter the size of Gigang Besar, lies a mile westward of it, and is also fronted by a reef, which off its north end, projects nearly a quarter of a mile.

A coral shoal lies off the south-west end of Gigang Ketchil, separated from it by a narrow channel of 17 to 22 fathoms water. From its shoalest patch of 3 fathoms water, which is on the western extreme of the shoal, the south-west end of Gigang Ketchil bears E. by S.  $\frac{1}{2}$  S., 9 cables. From this patch the shoal extend about S.E. by E. three-quarters of a mile, with depths of 4 to 9 fathoms.

Tambelan highest peak in line with the eastern extreme of Harbour island, leads half a mile westward of the shoal; and White rock in line with the southern extreme of Gigang Besar leads in 9 fathoms over its south-east end. White rock, kept well open of the southern extreme of Gigang Besar, leads to the southward.

Several other shoal patches and dangers were found near the Tambelan islands, but they lie out of the ordinary track of vessels, and the chart will be a sufficient guide.

At 3 miles north-west of the Gigang islands is a group of small islands, the north-eastern of which, Harbour island, or Pulo Smot, not quite half a mile in extent, limits the narrowest part of the channel between the two main groups of the Tambelan islands. At two-thirds of a mile westward of Harbour island, lies Pulo Bedua, which has four hills upon it, the highest, 408 feet high, being near its west end. Close to the southward of Bedua are two small islands, Untup and Lepi. A reef surrounds Bedua, and embraces Untup, extending from about a cable outside the eastern extreme of the former, to about the same distance outside the south-eastern extreme of the latter. The channel between Bedua and Harbour island is clear, with depths from 17 to 22 fathoms. Kapala Tambelan is a small island lying 2 miles south-westward of the Bedua group, and about a mile from the southern part of Bunoa.

The channel between the Gigang islands and the Bedua group, is free from danger, with soundings of 16 to 23 fathoms. A coral bank with 7 to 10 fathoms water over it, and 16 to 20 fathoms around, lies about  $1\frac{1}{4}$  miles S.W. by W.  $\frac{1}{2}$  W. from Kapala Tambelan, which island may be passed on either side. At three-quarters of a mile westward of Lepi is a patch of 3 fathoms, upon a bank having 4 to 10 fathoms on other parts of it: with the exception of this bank, the channel between the Bedua islands and those adjoining Bunoa is clear.

Bunoa, by far the largest island of the south-western group, is nearly 4 miles long N.W. and S.E., and  $2\frac{1}{2}$  miles broad. Its highest part, near its north-east end, is elevated 915 feet, and there are several other hills

upon it from 300 to 700 feet high ; these hills do not rise abruptly forming sharp peaks, but gradually, giving the upper part of the island an undulating appearance. The north shore of the island forms a bay, in which vessels may anchor in 10 to 16 fathoms, and find excellent shelter in the south west monsoon. Close to the east side of Bunoa are two smaller islands, Selindang and Gilla ; Selindang is a remarkable cone-shaped island rising to an elevation of 681 feet ; Gilla is about a third of the height of Selindang.

The group of ten islands extending nearly 5 miles to the north-westward of Bunoa, are all tolerably elevated, and Mundaga, the westernmost, is 697 feet high. The channels between are deep and generally free from danger, but that between Bunoa and Ebul (the island next to the north-westward of Bunoa) cannot be recommended as being perfectly safe, for the violent eddies and rippings led the officers of the *Rifleman* to infer that dangers existed in it, although, after a careful search, 4 fathoms was the least water found ; it is however possible that a small patch may have escaped the lead, and this channel had better, as a rule, be avoided. The *Rifleman* passed several times between Ebul and Panjang, which, although narrow, is a safe channel. A reef extends some distance from the north and north-east part of Ebul, which renders the channels between that island and Pulo Tamban \* and Pening islands dangerously narrow. A rock awash lies about a third of a mile from the south-west extreme of Leso, the island lying close to the western part of Bunoa ; elsewhere these islands appear free from danger, and may be approached to a half or a third of a mile with safety.

**North-eastern Group.**—Tambelan, the largest island of this group, is of somewhat triangular shape, and nearly  $4\frac{1}{2}$  miles in extent in a N.E. and S.W. direction. Upon its north-east coast are several hills, the highest of which, Tambelan peak, in lat.  $1^{\circ} 1' 5''$  N.,  $107^{\circ} 32' 22''$  E., rises to an elevation of 1,300 feet. Low peak, 643 feet high, is on the north-west end of the island ; and a short distance to the eastward of Tambelan peak is Thumb peak, a remarkable sloping hill 953 feet high. East peak, a sharp cone 950 feet high, rises near the eastern extreme of the island.

Tambelan island is nearly divided into two parts by a creek, which runs in a north-easterly direction into its western side. The creek is nearly a mile wide, but fringed with reefs and encumbered with several rocks. A breakwater, composed of coral, crosses its upper part, about  $1\frac{1}{2}$  miles within the entrance, leaving but a narrow boat channel, through which the tide sets with great strength. Behind the breakwater is a stockade, and a fort stands upon the shore near the west end of the breakwater.

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\* The principal observatory station of the *Rifleman's* survey was upon the north point of Pulo Tamban, which was found to be in lat.  $1^{\circ} 0' 27''$  N., long.  $107^{\circ} 24' 10''$  E.



The whole of these works have been constructed to defend the village, which is about half a mile beyond the breakwater on the western bank of the creek, from the attacks of the Llanun pirates, who occasionally visit these islands, and carry into slavery any of the natives they can capture; several were so carried off in 1860.

A reef extends from the east point of Tambelan island, and upon its edge, half a mile southward of the point, is a rock above water. Reefs fill up the bays on the south-east coast of the island. The north-east coast is almost free from reefs; but a small islet lies half a mile off shore, about the middle part of the coast, with another small islet close in shore abreast it. A reef, with a rock awash on its extreme, extends about one-third of a mile from the south-west point of the island, thence fronting the coast into Tambelan creek. A reef also extends a third of a mile from the north entrance point of Tambelan creek, and outside the small islet near that point fronts the coast and surrounds the small island which lies so close to the western extreme of Tambelan island as to appear a portion of it from many directions; thence the reef fronts the west coast at an average distance of about 2 cables to the north-west extreme of the island.

Pulo Bungin, 253 feet high, is a small island lying  $1\frac{1}{4}$  miles westward of the north-west point of Tambelan. Close to its east side is a small islet from which a sand-bank projects N.N.E. about a third of a mile, having a rock awash on its extreme. A rocky patch with 4 fathoms over it, lies nearly half a mile south-westward of Bungin, and irregular soundings, 4 to 9 fathoms, surround that island, except on its north-west side, where 12 and 16 fathoms will be found close to the beach.

Sedua Besar, 860 feet high, and Sedua Ketchil, 650 feet high, are two islands which extend from  $1\frac{1}{2}$  to  $3\frac{1}{2}$  miles north-westward of Tambelan island, separated from each other by a very narrow deep channel; both islands are hold close to. Sedua Besar (the larger island) lies next to Tambelan, and the channel between appears to be free from danger on either side of Bungin, with general depths of 19 to 28 fathoms, but with a patch of 9 and 10 fathoms near the west coast of Tambelan, and another of 17 fathoms midway between the north-west point of that island and Bungin.

Sendulang Besar and Sendulang Ketchil, lying 3 miles north-westward of the Sedua islands, are two small round-shaped islands, surrounded to a short distance by reef, and separated by a narrow channel. Sendulang Besar, the western and larger island, rises to a sharp cone, 749 feet high; the smaller island is only 309 feet high. The channel between Sedua Ketchil and Sendulang Ketchil is free from danger, with depths of 23 and 25 fathoms, and as much as 32 and 36 fathoms near the former island.

Pulo Way, the north westernmost island of the Tambelan group, is

about 2 miles in extent, and rises to several peaked hills, the highest of which, near its eastern end, is elevated 1,057 feet. The eastern extreme of the island forms a point, from which a reef extends about 2 cables in a north-easterly and easterly, and half a mile in a southerly direction; there is an islet or rock, a few feet above water, on the north-eastern extreme of this reef, and another on its southern extreme. The bays on the north-west side of the island are also filed with coral, otherwise the island is bold all around.

**Anchorage.**—There is good anchorage between the two groups of the Tambelan islands, which form an extensive basin or harbour; the depths being generally 17 to 20 fathoms, mud and sand. During the north-east moonsoon a vessel may anchor in the entrance to Tambelan creek,\* being careful to avoid a pinnacle rock with 12 feet water, which lies S.S.E. nearly a quarter of a mile from Suicides point, the north entrance point to the creek; this position would be unsafe in the south-west monsoon. The best anchorages during the south-west monsoon are in 9 to 14 fathoms in the bay on the north side of Bunoa island, or in 14 to 18 fathoms in the bay between Pulo Gilla and Bunoa.†

**Supplies.**—Vessels cannot depend upon procuring supplies at the Tambelan islands. The officers of the *Rifleman* could only obtain a few fowls with great difficulty. There is a well of good water just northward of the mound on the south side of Tambelan creek entrance, and another on the north side about 2 cables northward of Suicides point. The village in the creek is inhabited by about 500 Malays, and the other islands of the group are temporarily inhabited for the purpose of collecting cocoa nuts. Goats are also bred upon these islands, but during the *Rifleman's* visit none could be purchased.

**Coals.**—On Tambelan island there is a Netherlands government coal depôt (1871).

**EUROPE SHOAL** is about a mile in extent, N. by E. and S. by W., and the least water on it, 3 fathoms, is about the middle of the shoal, in lat.  $1^{\circ} 11' 19''$  N., long.  $107^{\circ} 25' 27''$  E., the Rocky islets bearing W.  $\frac{1}{4}$  S.  $12\frac{1}{4}$  miles; Gap rock E.  $\frac{3}{4}$  N. 9 miles; summit of Pulo Way S. by W.  $\frac{1}{2}$  W.  $5\frac{1}{2}$  miles; western extreme of the Tambelan group S.S.W.  $\frac{1}{4}$  W.  $6\frac{1}{4}$  miles; and eastern extreme S.E. southerly  $15\frac{1}{4}$  miles. Southward of the 3 fathoms patch, the shoal extends eastward nearly three-quarters of a mile with 6 to 10 fathoms water. Around the shoal the depths are 18 to 25 fathoms, and between it and the Tambelan islands 20 to 28 fathoms.

**Rocky Islets**, lying N.W. by W.  $\frac{1}{2}$  W. 12 miles from Pulo Way, are two barren rocks, about 2 cables in extent, and bold close to. The

\* See plan, on Admiralty chart of Tambelan islands, No. 361.

† Captain Corbett, H.M.S. *Scout*, 1862.

northern and larger rock, 134 feet high, is in lat.  $1^{\circ} 11' 9''$  N., long.  $107^{\circ} 13'$  E. Between these rocks and the Tambelan group the depths are 33 and 34 fathoms.

**Gap Rock**, in lat.  $1^{\circ} 12' 30''$  N., long.  $107^{\circ} 34' 20''$  E., and distant  $12\frac{1}{2}$  miles N.  $\frac{1}{2}$  W. from the eastern extreme of the Tambelan group, is very remarkable.\* It consists of two large boulders lying on a flat rock, the larger of which is 124 feet above the water. A shoal extends about 2 cables from its south side.

Close around the rock are 18 to 28 fathoms water, and midway between it and the Tambelan islands 30 fathoms, decreasing to 23 and 18 fathoms towards the islands.

**St. Julian**, in lat.  $0^{\circ} 55' 40''$  N., long.  $106^{\circ} 43' 30''$  E., is a remarkable island, nearly a mile long E.S.E. and W.N.W., and 200 yards broad. It is low in the centre, rising to a hill 318 feet high on the south end, and to another 537 feet high on the north end, which latter forms an exceedingly bold cliff to seaward. There is deep water close to on all sides.

**Camels Hump**, in lat.  $1^{\circ} 11' 46''$  N., long.  $106^{\circ} 53'$  E., is about a mile long, east and west, and a third of a mile broad. It is well named, the highest part of the island forming a sort of hump, elevated 574 feet above the sea. No danger was discovered in its vicinity.

**Saddle Island**†, in lat.  $1^{\circ} 19' 21''$  N., long.  $107^{\circ} 2' 17''$  E., is only half a mile long, and a quarter of a mile broad. This island is also well named; the hills forming the saddle are in line on a S.  $\frac{3}{4}$  W. and opposite bearing, the higher one on the north side being 387 feet high.

**BARREN ISLAND** is a whitish rock 80 feet high, in lat.  $1^{\circ} 31' 50''$  N., long.  $106^{\circ} 25' 35''$  E. It is justly denominated Barren, having not the slightest trace of vegetation, and is bold to, with 10 fathoms close alongside. It appears to be the resort of varieties of sea-fowl, which, in the season of incubation, deposit great quantities of eggs—the tern, kittiwake, and gulls occupying the summit, the booby, or gannet, the base. The Malay fishermen resort here for these eggs, and from the stores found *en cache* cannot be very particular as to their freshness. Of the eggs, those of the tern were not inferior to plover, and those of the gannet nearly equal to the duck, making very acceptable omelettes and puddings.†

**Water.**—On the north-west side of Barren island a kind of natural reservoir was noticed capable of containing about 10 gallons of water, evidently supplied by percolation from the higher portions of rock, as it flows over the margin of the reservoir, and marks the rock to the sea with a greenish hue. Doubtless this, if once cleaned out, would furnish good

\* See view on Admiralty chart No. 361.

† Sir Edward Belcher.

water, but the constant occupation by the wild fowl above it, and probably their ablutions in it, together with the slime surrounding, render it unfit for consumption. It is asserted nevertheless that it is used by the Malays possibly by previous cleansing of the reservoir. The rock is composed of grey basalt. Landing is easy on the western side.\*

**VICTORY ISLAND**, in lat.  $1^{\circ} 34' 41''$  N., long.  $106^{\circ} 18' 34''$  E., is densely wooded, and rises to a hill in the centre 285 feet high.

**HUGHES SHOAL**, with  $3\frac{1}{2}$  fathoms water, is composed of coral, one-third of a mile long, N.E. and S.W., and a quarter of a mile broad, its outer edge in 8 fathoms lying S.W.  $\frac{1}{4}$  W. three-quarters of a mile from Victory island.

**Acasta Rock**, lying N. by W. 4 miles from Victory island, is just under the surface of the water, and in calm weather presents the appearance described in Horsburgh, "the central part of a very brown colour, declining to a pale green around." The least swell breaks on it.

**ST. PIERRE ISLANDS**, situated about 40 miles W.  $\frac{1}{2}$  S. from Tanjong Api, the north-west extreme of Borneo, consist of two wooded islands, which appear to be connected by a reef; the westernmost and larger island is 350 feet high.

**St. Pierre Rock**, 8 feet high and steep to, lies South nearly  $1\frac{1}{4}$  miles from the southern St. Pierre island, and in lat.  $1^{\circ} 51' 42''$  N., long.  $108^{\circ} 38' 57''$ .\* This rock is about 30 yards long and 20 broad, formed of a close-grained black basalt, and has depths of 14, 15, and 19 fathoms close around. The channel between the islands and the rock is safe, having depths of 20 fathoms.

The *Rifleman* anchored near the position of the Breakers, which are stated in Horsburgh, to lie about 3 miles S.S.W. from St. Pierre rock, and sounded over and about it, but discovered no sign of danger. It is, therefore, removed from the charts.†

**Tides.**—The ebb tide between the St. Pierre islands and Tanjong Api sets to the southward, and the flood, which prevailed during the examination of St. Pierre rock, set to the north-east. Springs rise 4 feet.

**Soundings.**—A few miles to the southward of St. Barbe island (p. 25) the depths are 23 to 30 fathoms, decreasing to 20, 19, 16, and 14 towards Pulo Taya and Lingo, and to 19, 16, and 12 towards the coast of Borneo. Between Bintang and the Tambelan islands the depths are 22 and 23 fathoms near the Geldria banks and Pulo Panjang, 25 to

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\* Sir Edward Belcher.

† See Admiralty charts :—China [sea, southern portion, No. 3,660\* scale  $m=0\cdot05$  of an inch; and Borneo, N.W. Coast, sheet 1, No. 2,104, scale,  $m=0\cdot25$  of an inch.

32 fathoms in mid-channel, and 22, 30, or 31 near St. Julian, Camels Hump, &c. Between the Tambelan islands and the Borneo coast, the depths near the former are 26 to 32 fathoms, 20 and 24 fathoms in mid-channel, and 22 to 18 fathoms near the coast.

Between Singapore strait and the Victory and Barren islands, the depths increase, not very regularly, from 22, 24, and 26 fathoms, to 30 and 33 fathoms in mid-channel, and vary near the islands from 38 to 27 fathoms. Between Barren island and Saddle island the soundings vary from 32 to 41 fathoms, and thence towards St. Pierre islands from 28 to 32 fathoms. Near St. Pierre rock are 16 to 20 fathoms, and between it and Tanjong Api irregular soundings of 17, 19, 14, 15, and 19 fathoms, with 14 fathoms not far from the dangers extending from Tanjong Api.

**General Remarks.**—As the *Rifleman* was constantly shifting her position during the operations of the survey, no good opportunity offered for obtaining a series of tidal observations. Such as were procured were so irregular that no general conclusion could be formed from them. It was observed, however, that during the south-west monsoon (from the middle of July to the middle of September), and also during the north-east monsoon (in the month of December), that the tides set to windward every day against the prevailing current, although they were uncertain as to commencement and time of duration.

The weather was very fine\* and the winds generally light. Sailing vessels would frequently shorten their passages through this part of the China sea if they kept a kedge ready to anchor during light airs and calms, and when both current and tide would otherwise be setting them back over the ground they had with difficulty gained.

All the above islands, like most others in the tropics, are covered with a dense vegetation, and have generally white sandy beaches upon which turtle and the iguana may be found. The islands of the St. Esprit group and others are occasionally visited by small parties of Malays for the purpose of catching turtle. The only islands permanently inhabited are those of the Tambelan group, all of which have a few Malays upon them.

**Directions from Singapore Strait to Tanjong Api.**†—Quitting the Romania islands and shoals, where the tides are tolerably regular, the current off shore will be found to run about N.N.W. in the south-west monsoon, and having gained 50 miles easting, its greatest strength will be found setting between Pulo Timoan and the Anamba islands.

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\* The weather in the month of December the following year was very bad, heavy squalls and much rain. The *Rifleman* left Singapore to search for the Vega and other dangers at the entrance of Gaspar strait, but was obliged to relinquish that important work from continued bad weather.

† Sir Edward Belcher.

In order to obviate the effect of this set or current, it is considered prudent to make good the course for Saddle island, by which, should light airs prevail, the option will be afforded of steering either between Victory and Barren islands, or south of Barren islands; thus avoiding the Acasta rock. This caution may appear unnecessary, the distance between Barren and Camel islands being 33 miles. But a little consideration will satisfy the navigator that, upon the course shaped to counteract the current, running strong in the vicinity of these islands (to the north-eastward as near as could be determined by the lines of scum viewed from the summit of Barren island), he would not, even with a fair wind, pass more than 10 miles to windward of Victory and Barren islands. On leaving Barren island a course should be shaped to pass well to the southward of the St. Pierre islands.

In the north-east monsoon the current will generally be found setting about S.S.E., a few miles outside the entrance of Singapore strait, taking a more south-easterly direction as the distance from the land is increased. For directions for leaving Singapore strait during this monsoon *see* page 11.

The soundings off St. Pierre rock, and in the direct course for Tanjong Api, range between 20 and 15 fathoms, and approaching this headland the first cast under 15 fathoms at night should be deemed the warning. If in a sailing vessel deep water to the northward must be sought for. By day, as the land is neared the vessel's position may readily be determined by the relative position of the coast hillocks, with the mountain range behind, and if clear, the land of Tanjong Datu should be clearly made out before attempting to close, or communicate with, Tanjong Api.\*

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\* The entire range of Datu should present a detached mass, clear of the intermediate mangroves.

## CHAPTER III.

## SOUTHERN PART OF THE CHINA SEA.

ANAMBA AND NATUNA ISLANDS.—EAST COAST OF THE MALAY PENINSULA, WITH THE OFF-LYING ISLANDS AND DANGERS.

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VARIATION  $1^{\circ} 30'$  East in 1879.

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The **ANAMBA ISLANDS**, some of which are 800 feet high, consist of two large groups and several smaller ones, with numerous detached islets. The channels between the groups appear to be generally safe.\*

The **SOUTHERN GROUP** is comprised between White rock, high above water, in lat.  $2^{\circ} 20'$  N., long.  $105^{\circ} 34'$  E., and the parallel of  $3^{\circ} 10'$  N.

**Pulo Repon**, or Saddle island, in lat.  $2^{\circ} 25'$  N., long.  $105^{\circ} 52'$  E., the most southern island of the group, is about three-quarters of a mile in extent. Captain Goldsmith, of H.M.S. *Hyacinth*, states that this island has discoloured water three-quarters of a mile off its north-east end, with regular soundings of 33 and 35 fathoms, sand and shells, about  $1\frac{1}{2}$  miles to the westward of it.

Captain La Place, of the French covette *Favorite*, in April 1831, passed about midway between White rock and Pulo Repon, obtaining depths from 30 to 34 fathoms, muddy bottom.

**Baua** is a small group, about 11 miles north-eastward of Repon; and about 15 miles N.E. by E.  $\frac{1}{2}$  E. from Baua is another small group, named Rittan, which forms the south-eastern limit of the Anamba islands.

The **Riabu Group** extends from about 5 to 13 miles N.N.W. of the Rittan group. Pulo Riabu is high, about 6 miles in extent, having a smaller island, named Piling, close to the westward of it, and several islets and rocks off its south-east extreme.

**Djimaja**, situated  $21\frac{1}{2}$  miles west of the Riabu group, is the largest island of the westernmost group; this island is high, and about 14 miles

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\* See Admiralty charts:—China sea, southern portion, No. 2,660a; scale,  $m = 0\cdot05$  of an inch; and Anamba islands, with plans of Thetis channel, Paris cove, Tupinier bay, Terempa cove, and port Clermont, No. 1,371; scale,  $= m 0\cdot2$ .

in length, with several small islands, nearly joining each other, near its north-west extreme; Djimaja has a peak on it, and a bay on the north side, with islets and reefs about a mile distant on the western side, having depths of 24 to 35 fathoms near them.

**Courier Rock**, on which the *Courier* struck, is in lat.  $2^{\circ} 58' N.$ , about 3 miles from the western shore of Djimaja, and nearly the same distance S.W.  $\frac{1}{2}$  S. from Joulan point, which projects to the westward near the parallel of  $3^{\circ} N.$

**Pulo Domar**, in lat.  $2^{\circ} 45' N.$ , long.  $105^{\circ} 25' E.$ , the most western of the Anamba islands, is a high barren rock, with 34 or 36 fathoms water close to, 35 to 40 fathoms between it and Djimaja, and 32 to 39 fathoms in the channel between it and Pulo Aor. Sir E. Belcher states Pulo Domar to be 150 feet high, and that in fine weather safe landing may be effected on its south-east extreme.\*

**Telaga** or Peaked island, about 8 miles north-eastward of Djimaji, is about 3 miles in extent, and has a high peak on its northern end. Close to its north-west end is Little Telaga, an island about half its size, and close to its western side are some islets and rocks.

Several small islands lie between Telaga and Riabu, and between Telaga and Siantan island.†

**Nicado Rocks**, seen by the master of the Italian barque *Nicado*, 1878, are 5 feet high, and lie about 4 miles N.W. by W. from the north point of Little Telaga island, in lat.  $3^{\circ} 9' N.$ , long.  $105^{\circ} 50' E.$  (approximate).

**The NORTHERN GROUP** of the Anamba islands, situated between the parallels of  $3^{\circ}$  and  $3^{\circ} 30' N.$ , consists of three large islands with numerous small islands and islets to the south-eastward. The longitude of the most eastern islets is  $106^{\circ} 29' E.$  The larger islands are inhabited, and abound with tropical fruits and vegetables, but it is dangerous landing without due precaution, for the Malays who reside on them may probably massacre or make slaves of strangers, if they perceive a convenient opportunity.

Captain Laplace examined this group in 1831, and he makes the three large islands to extend from lat.  $3^{\circ} 9'$  to  $3^{\circ} 27\frac{1}{2}' N.$ , the two northernmost,

\* *Sulphur's Voyage*, vol. ii. p. 242.

† In sailing round the northern group of the Anamba islands, Telaga or Peaked island is a most remarkable object, and appeared higher than any land about it. Douraij island is high, about the same height as Paât island. Sendock is a low rock, and will not be seen, till Namas island (which is high and one mass of large rocks) bears about S.E. Guerite rock, when first seen, makes like a topsail schooner; on a nearer approach the stone on the summit appears like the top of a lighthouse, and on a S.W. bearing, like a schooner running before the wind.—Mr. J. W. King, Master, H.M.S. *Vernon*, June, 1847.



Mata and Mobur, having a channel about a mile wide between them, named *Selamata*,\* with depths of 15 to 28 fathoms in the south entrance and middle part; the northern part, which has several isles and rocks appears not to have been examined. Between the south point of Mobur the westernmost large island, and Mangar island, about a mile to the westward, is the entrance of a deep inlet, named Paris cove, which extends about 3 miles to the northward, nearly dividing Mobur island into two parts; this cove appears to form a safe anchorage, and has general depths of 23 to 17 fathoms, mud, decreasing near the shore at the upper part.

Siantan, the southern large island, fronts the south end of Mata, being separated from it by a channel from one to  $1\frac{1}{2}$  miles wide, in which the depths are 10 to 24 fathoms. The eastern entrance of this channel is obstructed by a chain of shoals, but there is said to be a narrow passage, with 5 to 9 fathoms water, to the southward of them, close along the reef that borders the eastern side of Siantan. The western entrance of the channel is 3 miles wide between Pedasse point, the north-west extreme of Siantan, and the south point of Mangar island bearing nearly North and South from each other; the centre of the entrance is in lat.  $3^{\circ} 16\frac{1}{4}'$  N., with depths of 24 to 32 fathoms. About  $1\frac{1}{2}$  miles eastward of Pedasse point is Terempa village, at the bottom of a small bay, where a vessel might anchor in 10 to 15 fathoms, sandy bottom, sheltered from all winds; and, 2 miles farther eastward, a bay is formed in the north-east part of Siantan, with depths of 10 to 15 fathoms near the reef that borders the shore, where it would appear by the chart vessels might anchor completely land-locked.

**Coals.**—On Siantan island there is a Netherlands Government coal depôt. (1871.)

### NATUNA ISLANDS.

The Natuna islands extend in a N.N.W.  $\frac{1}{2}$  W. direction 190 miles from Tanjong Api, the north-west extreme of Borneo. They may be divided into three groups: the South Natuna; the Great Natuna; and the North Natuna.†

**SOUTH NATUNA ISLANDS.**‡—This group, consisting of several islands, reefs, and shoals, is separated from the north-west coast of Borneo by Api passage, and extends to about lat.  $3^{\circ} 3'$  N. The two principal islands are Sirhassen and Subi.

\* More properly *Selat-Mata*; *Selat* being the Malay word for strait or channel.

† See Admiralty charts:—Borneo, sheet 1, South Natuna islands, No. 2,104; scale,  $m = 0.2$  of an inch; and Natuna islands, No. 1,348; scale,  $m = 0.2$  of an inch.

‡ Mostly from the surveys of the late Lieutenant D. M. Gordon, R.N., Commanding H.M. surveying vessel *Royalist*.

**Marundum**, 120 feet high, the southernmost island of the group, situated N.W. by W.  $\frac{1}{2}$  W., 14 miles from Tanjong Api, is about a mile in extent. A reef, dry at low water, lies about a mile off its west side, and there is a patch of  $4\frac{1}{2}$  fathoms about the same distance from its north-east side; the soundings round about are very irregular.

**Api Passage**, between the coast of Borneo and Marundum, appears to be free from danger, with depths varying from 11 to 23 fathoms.

**South Haycock Island**, situated N.W.  $\frac{3}{4}$  W.  $32\frac{1}{2}$  miles from Tanjong Api, is small and surrounded to the distance of about a third of a mile by a reef; there appears to be an islet, or rock above water, close to the southward of this island.

**Sembuni and Molu Shoals** comprise an extensive mass of dangers lying between Marundum and Sirhassen. The Sembuni is the name given to that portion which lies nearer to Marundum, the channel between that island and the shoals being 7 or 8 miles wide, free from danger, but with depths varying from 8 to 16 fathoms. The Larkin shoal, of Horsburgh, appears to be one of the Sembuni patches.

The Molu shoals lie to the eastward of South Haycock island and cover a space about 5 miles in extent; the channel between the island and the shoals is about 5 miles wide, with depths varying from 11 to 20 fathoms.

A rock with less than 6 feet water, lies north-east of the Molu patches, with Prantou island bearing N.  $\frac{1}{4}$  E.  $5\frac{1}{2}$  miles, and the apex of Brian island N.W.  $\frac{3}{4}$  W. 13 miles. Eastward of this rock is a space 7 or 8 miles in extent, which has not been sounded over, and where it is probable other dangers may exist.

**Sirhassen Passage** is bounded on the south by South Haycock island and the northern part of the shoals and dangers just described, and on the north by Sirhassen and its contiguous islands. Its narrowest part, between the rock north-east of the Molu shoals and Prantou island, is about 5 miles wide, and appears to be free from danger, although the soundings in this neighbourhood, are very irregular, 14 to 40 fathoms.

**Sirhassen Island** (High island of Horsburgh) is 9 miles long, east and west, and mountainous, except on its north side, where there is a low sandy bay having depths of 10 to 17 fathoms. Nearly joining the island on its south-west side are several islets, the largest of which, Brian island, is 760 feet high. These islets, having but very narrow channels between them, must at a distance appear as part of the main island. The chain of islets extending about 7 miles in a N.N.E. direction from the

north-east point of Sirhassen, affords partial shelter from north-easterly winds in the sandy bay before mentioned.\*

**Coals.**—On Brian islands there is a Netherlands Government coal depôt.

**Prantou**, a small island, 465 feet high, lies nearly 3 miles to the southward of the eastern extreme of Sirhassen, with a deep channel of 20 to 40 fathoms between them.

**Royalist Haven** is on the south-west side of Sirhassen island. The entrance is about 2 cables wide between Rimell and Wilkinson rocks, with 7 to 10 fathoms in the channel, and 7 to 11 in the haven; there are several rocky heads with deep water between them in and near the anchorage, in 9 or 10 fathoms, nearly half a mile within the entrance, though a vessel of large draught may thread her way between the coral heads at least 2 miles within the entrance towards Banff bay to the N.N.W.†

The leading-mark into Royalist haven is mount Koti (765 feet high, on the north-west part of the island), in line with David point bearing N.N.W.

**Koti Passage**, which separates Sirhassen from Pulo Panjung, is 9 or 10 miles wide, and appears to be free from danger; the depths are irregular, 15 to 30 fathoms generally, with 35 or 37 fathoms, no bottom, near mid channel.

This passage is often used by vessels proceeding from Singapore to Hong Kong against the north-east monsoon, and unable to weather Subi.

**Subi** (Flat island of Horsburgh), the northernmost and largest island of the South Natuna islands, is about 12 miles long north and south, and 5 miles broad, including an island about 2 miles in extent off its northern end, to which it is connected by a reef. It is also apparently connected with the smaller island of Panjung and its neighbouring islets, lying 7 miles to the S.S.E., by the surrounding reef.

Subi appears to be surrounded, except on its south-west side, with shelving rocks, to the distance of 2 or 3 miles, and on their outer edge are several rocky islets, the principal of which is Bucu, on the west side of the island. There are also several in a similar position on the west side of Panjung, and 16 miles south-westward of Subi is Seraia, or West island, 860 feet high, with the Doua rock  $1\frac{1}{2}$  miles north-eastward of it.

Pumumabung reef, lying about 3 miles West of the Panjung group, is

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\* It is reported that the ship *Lightfoot*, Pierce, master, from Whampoa to London, struck on a coral shoal, the 3rd September 1854, westward of Sirhassen island, in lat.  $2^{\circ} 32' N.$ , long.  $108^{\circ} 58' E.$ ; whilst the ship was on shore, found the current was setting to the eastward 3 knots per hour. *Horsburgh*, 8th edition, vol. 2, p. 179.

† See Admiralty plan of Royalist haven, with view, No. 2140; scale,  $m = 2$  inches.

about 2 miles long, east and west, and one mile broad, with soundings of 4 to 15 fathoms near it. There is also a reef, named Jabak, at  $3\frac{1}{2}$  miles N.N.W. from Pumumabung reef; and North, distant  $3\frac{1}{2}$  miles of the Doua rock, is the Jaring reef, with a bank extending about 3 miles to the north-eastward. There is also a reef, named Laut, off the east side of Subi, about  $2\frac{1}{2}$  miles outside the reef surrounding the island, from Laut reef the hill, 200 feet high, on the northern extreme of Subi bears N.W.  $\frac{1}{4}$  W., and the eastern apex of Pulo Panjung S. by W.  $\frac{3}{4}$  W. Vessels should be cautious in approaching the eastern side of Subi.

**The Soundings** round the South Natuna group vary from 10 and 15 to 30 and 40 fathoms, and to the south-eastward extend to the coast of Borneo in average depths from 14 to 20 fathoms.

**Current.**—The current at times is strong among the South Natuna islands, according to the prevailing winds. In the Koti passage it has sometimes been found to run  $2\frac{1}{2}$  miles per hour to the northward, during the south-west monsoon.

**The Channel** between Subi and Low island is ordinarily used by vessels proceeding to China by the Palawan route, during the north-east monsoon, although, as has been previously remarked (page 10), it sometimes happens that vessels are unable to weather Subi, and find it convenient to proceed through the Koti passage.

**Low Island**, situated 60 miles West from Subi, is about  $3\frac{1}{2}$  miles long north and south, and  $2\frac{1}{2}$  miles broad, having shoal water extending a considerable distance from its eastern and western sides; great caution is therefore necessary in passing to the southward of Low island.

**Jackson Reef** lies off the south-east part of Low island, in lat.  $2^{\circ} 56' N.$ , long.  $107^{\circ} 55' E.$  The bottom was perceived in 14 fathoms, coral, and the boat, in sounding near the ship, had from 5 to 7 fathoms, coral; in one place only  $4\frac{3}{4}$  fathoms, with apparently less water on other patches of this coral shoal, which extends about 2 miles in a S.E. and N.W. direction, bearing from the east point of Low island E.S.E., distant about 6 miles. This shoal ought to be avoided, as well as Hutton reefs to the northward; they may probably be a continuation of the chain of shoals formed of coral patches, now ascertained to exist in the proximity of Low island.

**Hutton Reefs** are thus described in the journal of Mr. Howard: Observing shoal water to extend a long distance off the east and west ends of Low island, edged out to give it a wide berth in passing on the south side. From 10 a.m. to noon steered E. by S. 3 miles, and East 2 miles, when discoloured water was seen bearing East; hauled up N.E. by N. to go between it and the island, the extremes of the latter then

bearing from N.W. by N. to W. by N., distant about 3 miles, observed lat.  $2^{\circ} 59' N.$

In passing between the shoal and island, the least water was 8 fathoms, rocks, with the east part of the island bearing S.W. by W.  $\frac{1}{2}$  W. 3 miles, and the nearest patch of shoal water S.E. This appears to be an extensive shoal, consisting of patches, and formed in the shape of a horse-shoe. After passing between it and Low island, sent the first officer in a boat to examine the nearest patch, on which he had  $3\frac{3}{4}$  fathoms, pyramidal rocks, and there is probably less water on some of the patches, with channels between them. The south or outer patch appeared to lie 4 or  $4\frac{1}{2}$  miles from Low island in an E. by N. or E.N.E. direction.

**Diana Reefs.**—This dangerous coral reef lying to the N.N.W. of Low island, is thus described by Lieutenant Kempthorne, who grounded upon it in H.M. brig *Diana* :—Saw the bottom, and sounded in  $4\frac{3}{4}$  fathoms, but lost the lead, by its getting fixed in the coral. Wore to the eastward, and had  $5\frac{1}{2}$ , 6, 7, 8, 10, 11, 17 fathoms, then no bottom at 20 fathoms. The boat sent to sound had  $3\frac{1}{2}$  fathoms, and several casts of  $5\frac{1}{2}$  fathoms on the points of coral, with deep water between them; two spots of discoloured water, one bearing South, and the other S.W. by W. about 2 miles, appeared much shoaler than where the boat sounded. The shoal seemed to extend N.E. by E. and S.W. by W.  $1\frac{3}{4}$  miles; no broken water was visible upon it, but when the swell rolled over the points of coral, it resembled a shoal of fish.

When the bottom was first seen in  $4\frac{3}{4}$  fathoms, the north-east point of Low island bore S.E. about 9 or 10 miles, and the north-west point, with the south-west point just open of it, S.S.E.  $\frac{1}{2}$  E., and North Haycock island, N.  $43^{\circ}$  W. Where the boat sounded, she had nearly the same bearings, but was half a mile more to the N.W., with North Haycock island just in sight from her.

**CAUTION.**—The channel between the Natuna and Anamba islands is 88 miles wide, and safe in daylight; but as several shoal coral patches have been discovered, and other shoals, yet unknown, may probably exist in the vicinity of the Natuna, a good look-out is necessary. A shoal, named Yong Sabal bank, is said to lie W.  $\frac{1}{2}$  S. 19 miles from the south-west point of Low island.

**North Haycock Island**, in about lat.  $3^{\circ} 17' N.$ , long.  $107^{\circ} 34\frac{1}{2}' E.$  is high, of conical shape, having a reef projecting 3 or 4 miles from it to the south-west and south, with 30 and 33 fathoms near its edge.

**Elphinstone Rock**, about 69 feet. high is named after the ship which discovered it in 1844, and is thus described by her commander, Mr. Crawford :—From the southward a reef projects about a mile, at the

extreme of which is a rock which is partially covered at high water. From this a dangerous reef projects a long distance to leeward, and is probably a continuation of the Hutton or Diana reefs. To the northward of the main rock there appears to be a safe passage. This rock is in lat.  $3^{\circ} 23' N.$ , long.  $107^{\circ} 50\frac{1}{2}' E.$ , and in a dark night with thick weather a ship would be on it before it could be seen, as the soundings are no guide; from 40 to 23 fathoms in a cast.

**GREAT NATUNA ISLAND**, named Pulo Boongouran by the Malays, extends from  $3^{\circ} 38\frac{1}{2}'$  to  $4^{\circ} 16\frac{1}{2}' N.$ , and two small islands off the north point, joined to it by a reef, extend about 3 miles farther, with 17 fathoms water within a mile of them. The north extreme of the island is in long.  $108^{\circ} 11\frac{1}{2}' E.$ , and the east extreme in  $108^{\circ} 23' E.$ , its breadth being about 25 miles.

The interior of the island is mostly high; and on the northern part are two mountains of considerable elevation, mount Bedong or Quoin hill, in lat.  $4^{\circ} 3' N.$ , and mount Ranay, near cape Senubing, the east point of the island, in lat.  $4^{\circ} N.$ ; the latter is 1,890 feet high, and may be seen 44 or 45 miles. Some of the projecting parts of the coast are rather low, particularly from lat.  $4^{\circ} N.$  to the north end of the island, where there are red cliffs.

Reefs and islets front the eastern coast of this island, rendering it dangerous to approach under 6 or 7 miles in some places, at which distance the depths are usually from 34 to 46 fathoms. Mr. Whiteside, commanding the ship *Sarah*,\* describes an extensive coral bank in patches, in passing over which the ship received a slight shock, at the time a small island off the Natuna bore S.W. by W., distant about 6 miles. A one-fathom patch, in lat.  $4^{\circ} 4' N.$ , long.  $108^{\circ} 26' E.$ , named Mieulle reef, agrees with this bearing, but is only half that distance from the small island, which is named Senoang, and lies close to cape Senubing, the east extreme of Great Natana.

**Devonport Rock**, on which the British ship *Devonport* struck and was lost in 1869, has 17 feet water, with 34 fathoms in its vicinity. From the ship the following bearings were taken: Senoang island N.W., and Kamodi island S.W. by W., which places it in lat.  $3^{\circ} 54' N.$ , long.  $108^{\circ} 31' E.$  (approximate).

A reef lies S. by E.  $\frac{1}{2} E.$ , distant  $3\frac{1}{2}$  miles from Kamodi, the outermost of two islets lying off this coast at 10 miles south from cape Senubing; and another reef is said to lie 3 or 4 miles farther in the same direction from that islet.

**Lamiena reef**.—The Dutch vessel *Lamiena Elizabeth* struck on a reef said to lie off the south-east coast of Great Natuna, with Kamodi and Jantay islets nearly in line bearing N. by E.  $\frac{3}{4} E.$ ; the nearest high land on

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\* Nautical Magazine, 1837, p. 10.

Natuna W. by N.  $\frac{1}{4}$  N.; the south point of the same W.  $\frac{1}{2}$  N.; and the point of Lagong island about W. by S.\* It appears necessary to be cautious in approaching the eastern and south-eastern coasts of Great Natuna.

The western coast of Great Natuna is also fronted by high islands, the chief of which are the Duperré islands, lying near its south-west extreme. Sédédap, in lat.  $3^{\circ} 34' N.$ , is the southernmost.†

**Salaor**, or Peaked island, in lat.  $3^{\circ} 53' N.$ , lies  $6\frac{1}{2}$  miles from the shore.

**Seluan** or North-west island, in lat.  $4^{\circ} 9' N.$ , long.  $107^{\circ} 50' E.$ , has a reef projecting a mile or more from its south point, with depths of 30 to 20 fathoms on its south-west side; a reef lies  $2\frac{1}{2}$  or 3 miles from the western side of this island.

A reef of coral rock, with 12 feet water, and 20 to 30 fathoms near its west and south-west sides, lies in lat.  $4^{\circ} 3' N.$ , about 5 miles S.S.W. from Seluan island; and about 5 miles S.W.  $\frac{3}{4}$  from this reef, and 10 miles N.W. by W. from Salaor island, and about the same distance from Seluan island, is another coral shoal in lat.  $3^{\circ} 59' N.$ , having 3 fathoms on it, and from 20 to 30 fathoms, mud, close around: these shoals were explored by Captain Ross in 1814. There is also a reef named Semapi, apparently of considerable extent, lying midway between Seluan and the north point of Great Natuna, at 9 or 10 miles off shore.

**PYRAMIDAL ROCKS**, in lat.  $4^{\circ} 3' N.$ , long.  $107^{\circ} 21\frac{3}{4}' E.$ , are in the track of vessels returning from China late in the season, when they pass between the Anamba and Natuna islands, proceeding towards Gaspar strait. The *Windham and Coldstream*, in 1817, passed on the east side of these rocks at 4 miles' distance; they described them as a clump, of rugged aspect, elevated about 20 or 25 feet above the sea. The *General Kyd*, commanded by Mr. Nairne, in 1818, passed 4 or 5 miles to the westward of them; when Seluan island bore N.  $85^{\circ} E.$ , the rocks were on a transit line with Salaor island bearing S.  $72^{\circ} E.$ , distant 4 or 5 miles.

In 1863 a line of soundings was obtained by the *Rifleman* from Victory island to the position of a doubtful rock said to lie 11 miles S.W. of the Pyramidal rocks. The *Rifleman* passed close to the spot without discovering any danger, and had soundings in 33 fathoms. The Pyramidal rocks were also passed within 4 miles, but it was getting too dark to examine

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\* *Netherlands Government Notice, published at Batavia in 1837.*

† Captain La Place, in *la Favorite* corvette, passed between the Duperré group and the south-west part of Great Natuna, in soundings usually from 24 to 12 fathoms, named Canal La Place on his chart; but it seems to be narrow and intricate, interspersed with reefs, both detached, and fronting the isles on either side; consequently, not safe for large vessels without great caution.

them closely. They appeared however as described in Horsburgh, and to be near their assigned position.

**A Doubtful Rock** is said to lie in lat.  $4^{\circ} 11' N.$ , long.  $107^{\circ} 34\frac{3}{4}' E.$ , about 15 miles N.E. by E. from the Pyramidal rocks, and the same distance to the westward of the north point of Seluan island.\*

**Success Reef** is about two miles in extent, in lat.  $4^{\circ} 22' N.$ , long.  $107^{\circ} 55' E.$ , nearly mid-way between Semione island and the north point of Great Natuna. When the breakers on the reef were seen from the ship's deck bearing E. by S. about 2 miles, Semione bore N.W.  $\frac{3}{4}$  W. about 12 miles; the eastern extreme of North Natuna N. by E.; and the western extreme of Great Natuna S. by W.  $\frac{1}{4}$  W. about 20 miles. The ship afterwards tacked in 35 fathoms within a mile of the breakers. The *Favorite*, passing close to the eastern extremity of this danger, obtained soundings of 30 to 20 fathoms, sandy bottom.

**Semione or Saddle Island**, 360 feet high, in lat.  $4^{\circ} 31' N.$ , long.  $107^{\circ} 42\frac{1}{2}' E.$ , is well wooded; a reef projects from its south end, and another from the north-west end, with less than 3 fathoms water on it, and 40 fathoms close to.

There is a rock above water about 4 miles S. by W.  $\frac{1}{2}$  W. from this island, and between them are depths of 28 fathoms.

**The NORTH NATUNA ISLANDS** are of moderate height, inhabited by Malays, and produce cocoa-nuts and other fruits. They comprise an island named Pulo Laut or North Natuna (Sea island), stretching N.E. by N. and S.W. by S. 8 miles, with Stokong, a smaller island, near its northern extreme, and several islets and rocks close to its southern end, upon the reef that fronts the shore. There is also a rocky islet, in lat.  $4^{\circ} 39' N.$ , about  $2\frac{1}{2}$  miles S. by E.  $\frac{1}{2}$  E. from the south-east point of Laut.

**Glamis Castle Rock.**—The British steam vessel *Glamis Castle*, 1878, is said to have struck on a rock, about 4 miles east of North Natuna island. The least water obtained on this rock was 10 feet, with the North point of Stokong island bearing N.N.W. and south-east point of Pulo Laut S.W.

**Gloria Reef**, composed of coral and stones, on which the Spanish steam vessel *Gloria* was wrecked in May 1877, lies  $5\frac{1}{2}$  miles south of Pulo Laut. From the wreck, lying in 15 feet water, the west extreme of Pulo Laut bore N.N.W.; and the south extreme of Semione island W.S.W.

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\* The Netherlands Government Notice, previously alluded to, states that a rock, 25 feet above water, was discovered lying N.E. by E.  $\frac{1}{4}$  E. of the Pyramidal rocks. Its appearance was similar to those in the neighbourhood of Pulo Semione, and it is said to be in long.  $107^{\circ} 34' E.$



North-eastward of this position, at the distance of half a mile, the depth of 8 fathoms was found ; eastward, 3, 5, and 7 fathoms, at half, one, and 2 miles respectively ; nearly midway between it and Louise reef, 12 feet ; on the south and south-west sides, 17 fathoms at the distance of about a mile ; and N.N.W. 9 fathoms at the distance of 2 miles.

**Louise Reef** on which the French ship *Louise et Marguerite* struck in 1873, lies about 2 miles south-eastward of Gloria reef, with which it is probably connected.

The vessel at the time of striking drew 15 feet, and then obtained a sounding of 11 fathoms. Bearings were taken immediately after the vessel cleared the danger, when the rock lying  $2\frac{1}{2}$  miles south of the S.E. point of Pulo Laut, bore North (westerly) and the south-west point of Pulo Laut N.N.W.  $\frac{1}{4}$  W., which place the reef in lat.  $4^{\circ} 34' 40''$  N., long.  $107^{\circ} 39' 40''$  E. (approximate).

**Cockeran Bank**, with 8 fathoms water, lies about 5 miles westward of Louise reef, from the centre of the bank Semione island bears W. by S.  $\frac{1}{4}$  S., distant 3 miles.

**Soundings.\***—There are 35 fathoms water about  $1\frac{1}{2}$  miles N.N.W. from Stokong, but the whole of the western coast of Pulo Laut is fronted by a dangerous reef, which extends nearly 5 miles W. by S. and W.S.W. from the south-west point of that island, having no bottom at 40 fathoms within a mile of its west extreme ; north and south of this extreme there are soundings of 32 to 36 fathoms, mostly coral bottom. The soundings near these islands are irregular in some places, the *Laurel* having obtained 20 to 10 fathoms, and 7 fathoms, coral rock, with the islands bearing from N.W. by W. to W.S.W., distant 5 or 6 miles ; when the centre of Pulo Laut bore S.W. 3 or 4 miles, the soundings were more regular.

## EAST COAST OF THE MALAY PENINSULA, WITH THE OFF-LYING ISLANDS AND DANGERS.

**The EAST COAST of the MALAY PENINSULA,†**  
from Romania point, its south-east extreme, to opposite Pulo Varella, is

\* The *Rifleman*, 1863, obtained a line of soundings from Pyramidal rocks to the position of the French rocks, shown on former charts as three rocks above water in lat.  $5^{\circ} 27' N.$ , long.  $107^{\circ} 38' E.$  Their position was approached on a W. by N.  $\frac{1}{2}$  N. bearing, and at noon the *Rifleman* was 2 miles North of it. She then steered South  $7\frac{3}{4}$  miles, N.W. 9 miles, and N.E.  $6\frac{3}{4}$  miles, without discovering any signs of the rocks. The soundings about the spot were from 35 to 40 fathoms. These rocks are not mentioned in Horsburgh, and we are not in possession of any particulars respecting them.

† The description of this coast is derived chiefly from a survey by Mr. J. T. Thomson, Government Surveyor [of the Straits Settlements, 1849, and from Horsburgh. See Admiralty chart :—Malay peninsula, eastern coast, Singapore to Tioman, No. 2,041 scale,  $m = 0.24$  of an inch.

mostly low and woody, its general direction being about N.N.W. Close to the coast, especially off the points, there are many rocks, both above and below water, but they appear to lie within the 3 fathoms line of soundings, with the exception of Gading rocks, near Blair harbour ; so that when clear of Romania reef the coast in most parts can be safely approached by the lead. The space between Sitajam point and Little Sidili, was sounded over by H.M.S. *Saracen* ; no danger was discovered, and the depths were found to decrease gradually towards the shore.

It was formerly a common practice for vessels bound from China to Singapore, Banka, or Gaspar straits, to work close to this coast. Now, however, as has been previously remarked (page ), those from China usually stand to the southward as soon as they can weather the reefs. Vessels from Siam bound to the southward against the south-west monsoon, generally find it most convenient to keep as close as possible to the Malay coast, where they meet with regular tides, whilst a constant northerly current is found a few miles from the coast.

**Pulo Eu**, described as a round bluff rock, in lat.  $2^{\circ} 7' N.$ , long.  $104^{\circ} 17' E.$ , is the south-eastern of a chain of islets and rocks which lie parallel to and about 12 miles from the east coast of the Malay peninsula.

**Ambong Reef** lies 7 miles north-west of Pulo Eu ; and nearly in a line between them lie four small islets, or rocks above water, named respectively Chupa, Chondong, Gantang, and Belelei.

**Lima Island**, lying about  $1\frac{1}{4}$  miles north-west of Ambong reef, is nearly half a mile in extent, having two rocks above water, named Raket, about half a mile E.S.E., another rock just to the northward of its west extreme, and another, named Sangul, nearly a mile W. by N.  $\frac{1}{2}$  N. from it: they all appear to be connected and surrounded to a short distance by a reef.

**Channels.**—There appears to be a safe channel, 3 miles wide, between the islands north-west of Pulo Eu and the Sibou islands, with depths of 9 to 14 fathoms. There also appears to be a safe channel, 2 miles wide, between the north-western end of these islands and the islets and rocks extending southward and south-eastward from Pulo Tingy.

**SIBOU ISLANDS**, situated about mid-way between the chain of islets extending from Pulo Eu and the main land, consist of one large and several small islands and rocks. Sibou island, the northernmost and largest, lying about 5 miles from the coast, is a narrow island 3 miles long N.W. and S.E., and near its south end is a hill, 553 feet high, overlooking a small bay, from the western point of which a dry bank extends about half a mile. A small island named Middle Sibou, and two islets or rocks named respectively Sibou Kukus and South Sibou, together with other rocks both above and below water, extend in a south-easterly direction

from Sibou, for a distance of 2 miles. The western side of the group is dangerous to approach, owing to a reef which joins the different islands and extends from a half a mile to a mile from them. The north-west point of Sibou is steep to ; but close to the north point is a rock upon the inner part of a narrow bank which projects in a northerly direction about 2 miles ; over this bank are 4 or 5 fathoms water, with 7 or 8 fathoms on either side of it.

**SIBOU CHANNEL**, between Sibou and the main, is about  $2\frac{1}{2}$  miles wide in the navigable part, with general depths of 6 to 8 fathoms. The soundings decrease regularly towards the main, but shoal suddenly from 9 or 10 to 3 fathoms towards Sibou. Preference should therefore be given to the main shore of the channel, by keeping in 6 or 7 fathoms water ; and when working through, it would seem prudent to tack when the water deepens to 8 fathoms.

**Pulo Tingy**, 2,046 feet high, situated 5 miles N.N.E. from Sibou island, is nearly 4 miles long N.W. by W.  $\frac{1}{2}$  W. and S.E. by E.  $\frac{1}{2}$  E., and 2 miles broad ; on its north side, in a small bay, there are cocoa-nut trees, banana trees, and huts.

A cluster of islets and rocks extend nearly 2 miles southward and south-eastward from Pulo Tingy ; about half a mile from its north-east shore lies a small island named Ibul, with Peniambang islet between it and the shore ; sunken rocks extend a short distance east of Ibul island.

About  $1\frac{1}{4}$  miles off the north part of Pulo Tingy lie Gebang rocks, south-westward of which is the Siam knoll of 3 fathoms, lying about one mile off the north-west part of Tingy, having deep spring water between. In fine weather these rocks are visible at low water spring tides ; but there are heavy breakers on it in the north-east monsoon.\*

**Morau rocks**, or Arethusa reef, appears to be a reef under water, extending northward and eastward of a small islet, which lies  $4\frac{1}{4}$  miles N.N.W. from Sibou island, and W.  $\frac{1}{4}$  S. from the peak of Tingy, and nearly in mid-channel between Tingy and the main ; close to the east side of these rocks are 10 fathoms water.

**Babi islands**.—Babi, or High island, lying 9 miles N.W. from Pulo Tingy, is  $2\frac{1}{3}$  miles long N.N.W. and S.S.E., and three-quarters of a mile broad. On its south end are two peaks, the northern of which is 911 feet high ; some rocks appear to lie close to its southern shore. Middle Babi, an island about half a mile in extent, with several islets and rocks close to, lies nearly  $1\frac{1}{2}$  miles north-westward of Babi ; and three-quarters of a mile north-westward of Middle Babi, is a rather larger island named North Babi.

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\* Captain Ross, H.E.I.C. steam-vessel *Phlegethon*.

**Water.**—Captain Ross, in the *Phlegethon*, in the month of August, having found the two watering places on the south-west part of Pulo Tigny dry, proceeded to Babi island, and found three springs of clear fresh water, the principal one on the north-west point of the island, southward of a small patch of mangrove jungle. The following bearings were taken from the *Phlegethon* when at anchor: extremes of Babi island, N.  $\frac{1}{2}$  E. to S.S.E.  $\frac{1}{2}$  E.; the best watering-place, N.N.E.  $\frac{1}{2}$  E.; the two smaller, N.E. by E. and E.N.E. Regular soundings were found between Babi island and the main land, there being  $8\frac{1}{2}$  fathoms, mud, in mid-channel, decreasing gradually on either side to 5 fathoms, sandy bottom.

**Tikus Rock**, above water, with small detached rocks around it, lies  $3\frac{1}{4}$  miles eastward of the southern part of Babi.

**Sakit Mata** is a rock awash, lying E.  $\frac{1}{4}$  N., distant nearly  $2\frac{1}{2}$  miles from the north point of Babi.

**Rawa** is a small island, about half a mile in extent, lying  $3\frac{1}{2}$  miles North from Babi, and  $2\frac{1}{4}$  miles N.E. from North Babi. From Rawa a chain of islets and rocks extends 3 miles to the north-westward, terminating in a small island named Gurong, 4 miles north from North Babi.

**Siribuat Islands**, situated N.N.W. 7 miles from Gurong, consist of two islands, the eastern and larger being about  $1\frac{3}{4}$  miles in extent. The western island, 748 feet high, is a little more than half the extent of the eastern. These islands are connected by a reef, upon which are some islets and rocks. Close to the north-east part of the eastern island are two islets or rocks named Santu.

Three or four small islands, named Mirtang islands, joined together by a reef, lie nearly 2 miles southward of the western Siribuat island; it is doubtful if there be a safe passage between Mirtang and Siribuat.

**BLAIR HARBOUR.**—Kaban island,  $1\frac{1}{4}$  miles long N.N.W.  $\frac{1}{2}$  W. and S.S.E.  $\frac{1}{2}$  E., and half a mile broad, lies W. by S.  $6\frac{1}{2}$  miles from the Siribuat islands, and forms with a prominent point of the coast named Peniabong point, about a mile distant, Blair harbour. About a mile south-eastward of the south entrance of the harbour, lies Gading rock above water with sunken rocks around; rocks also appear to extend from the points on both sides of the south entrance, thus materially contracting the channel. A small island, named Little Kaban, lies about a mile northward of Peniabong point; other islets and rocks lie to the westward of the point. North-westward of Kaban is a group of islets and rocks named Tonos, and in the same direction, distant 2 miles from Kaban, is a small island named Leiar.

Horsburgh states that Blair harbour is safe, sheltered from all winds, with anchorage in 4 and  $4\frac{1}{2}$  fathoms, stiff mud. It is easy of access by

passing between the north point of Kaban and the small islands, where the depths are 6 and 7 fathoms, decreasing to 5 and  $4\frac{1}{2}$  fathoms within. There is also good anchorage under some of the other islands farther out; Captain Purefoy in a gale from the N.E., ran under one of them, which he named Shelter island, and remained at anchor in smooth water until the gale became moderate and the weather clear.

Captain Pridham, R.N., who touched here September 8th, 1830, gives the following description of a rock in the entrance of the harbour, not previously known:—"At anchor, well sheltered in Blair harbour, discovered, on the falling of the tide, a rock above water about the size of a small boat, near the outer northernmost island that forms the entrance into the harbour, the extremes of which bore N.  $\frac{1}{2}$  W. and N.N.E.  $\frac{1}{2}$  E. from it. There is deep water around the rock, 5, 6, and 7 fathoms within a few yards, and a passage between it and the above-mentioned island, which might be used with a leading wind." This rock is now placed upon the chart about half a mile South of Leiar island.

**Water.**—Plenty of good water may be procured on Kaban island by digging wells 5 feet deep, about 20 or 30 yards from high-water mark.

**The INNER CHANNEL**, between the Malay coast and the groups of islands just described, viz., Sibou, Tingy, Babi, and Siribuat, is safe by keeping along the coast at 3 or 4 miles distance. The depths are 8 to 11 fathoms, in the fair track, usually soft ground, with a few casts of sand in some places about midway between Tingy and the main. With a working wind a vessel may borrow towards the main, generally to 7 and in some places to 6 fathoms, and stand off to 11, 12, and 13 fathoms. The channel is safe in the day, but in the narrow parts, among the islands, it is prudent to anchor at night, because some of the rocks or islets are very little above water; several vessels have, nevertheless, proceeded through in the night.

**Tides.**—It is high water, full and change, about 20 miles southward of the entrance to the Inner channel, at 9 h. 14 m.; springs rise 6 to 8 feet. Near the Siribuat islands it is high water, at 8 h. 50 m., and the rise is 9 feet.

In fine and moderate weather, tides will generally be found setting along the coast, but currents predominate when the wind blows strong, running to the southward in the north-east monsoon, and in the opposite direction during the south-west monsoon.

**PULO AOR**, situated in lat.  $2^{\circ} 26' \frac{1}{2}$  N., long.  $104^{\circ} 32'$  E., is small, thickly wooded, and has two peaks lying N.W. and S.E. from each other; the southern peak is 1,805 feet high, and the northern 1,521 feet

high. Pulo Aor is generally adopted as a point of departure by vessels bound to China, and steered for on the return passage. Being formed of two hills, it has the appearance of two islands when viewed at a great distance on a N.E. or S.W. bearing, and resembles a saddle on a nearer approach. The southernmost peak is dome-shaped, and in clear weather may be seen 45 or 48 miles; when midway between Bintang hill and Pulo Aor they are visible together.

The bay on the south-west side of the island affords shelter in the north-east monsoon, when the wind is between North and E.S.E.; and those unacquainted with the entrance of Singapore strait frequently anchor in this bay during dark, hazy, blowing weather, until it becomes more favourable for running into that strait.\*

Pinang is a small islet, covered with trees, lying close off the south-east point of Pulo Aor, and Lang is a small islet lying about half a mile from the north-west point. Dyang islet, about one mile long east and west, and half a mile broad, is separated from the north end of Aor by a narrow channel having 18 or 19 fathoms water in it.

The depths near Pulo Aor to the northward and eastward are 32 to 35 fathoms, to the westward 24 and 25 fathoms, decreasing to 16 or 17 fathoms towards Pulo Tingy.

**Supplies.**—Pulo Aor is inhabited, and there are numerous huts around the bay; firewood and cocoa-nuts may be procured, but no other refreshments, except water. Vessels water with their own boats; the natives, although shy of strangers, are generally found to be inoffensive; it is, however, imprudent to go into the country.

**Tides.**—There is a rise and fall of tide about 5 or 6 feet, although the current in the offing sets mostly with the monsoon.

**Directions.**—If coming from the northward and intending to anchor in the bay on the south-west side of Pulo Aor during N.E. winds, pass on the west side of the island, in order to fetch into the bay so far as the watering place, which is a small running stream on its north shore. After rounding the west side of the island, which is steep-to, at any convenient distance, haul into the bay until Lang island is in line with the north-west point, and anchor in 20 to 15 fathoms, sandy bottom, with the extremes bearing from N.W. to S.E.  $\frac{1}{2}$  E., off shore about half a mile; but sail ought to be reduced in time, because from 20 fathoms the bank is steep, and it would be imprudent to shoal under 15 fathoms in a large vessel.

**Pulo Pemangil**, named by Horsburgh Pisang or Pambeelan,

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This has not been a common practice since the establishment of the Horsburgh light, at the entrance of Singapore strait.

situated 11 miles N.W. by W. from Pulo Aor, has two peaks lying in a north-west and south-west direction from each other, the southern peak, 1,507 high, and the northern 1,227 feet high. Pulo Pemangil resembles Pulo Aor when seen from the north-east or south-west. It is said that water may be obtained upon Pemangil; but vessels seldom stop here, for it is not inhabited, and affords no supplies. The bay on its south-west side is similar to that on the south-west side of Aor; the anchorage is in 18 or 19 fathoms, a mile off shore. A remarkable perpendicular rock will be seen on the side of the hill close to the sea.

**PULO TIOMAN**, situated N.W.  $\frac{1}{2}$  W. about 22 miles from Pulo Aor, is 11 miles in extent, north and south, and 2 to 6 miles broad. This island is composed of lofty mountains, the highest of which rises to an elevation of 3,444 feet, and may be discerned 55 or 60 miles in clear weather. On its south end are two remarkable peaks, named from their aspect Chula Naga, or Asses' Ears, standing on one base, and rising almost perpendicularly from the sea to heights of 2,525 and 2,294 feet. There is a village on the south-east side of the island in a small sandy bay, which has anchorage in 20 or 22 fathoms, sand, and may be used during fine weather; but the bay on the south-west side of the island affords the best shelter in the north-east monsoon. If intending to anchor here, when coming from the northward, pass close round the north-west end of Tioman, between it and the small islands, the passage being  $2\frac{1}{2}$  miles wide, with depths of 24 to 20 fathoms. Keeping about  $1\frac{1}{2}$  or 2 miles from the western shore of Tioman, the water will shoal gradually in the bay to 10 or 9 fathoms, sand and gravel; the best berth is in 15 or 16 fathoms, with the island bearing from E.S.E. to N.N.W., and the middle of the sandy bay N.N.E.  $\frac{1}{2}$  E.

**Water; Wood.**—There is a small river on the east side of this bay, where boats can fill their casks; but a bar at the entrance prevents their going in and out at low water. At a small rivulet on the north-west side of the bay, fresh water may be filled at all times. Firewood may be procured in abundance near the shore. Refreshments are not to be obtained here, the bay seldom being inhabited, although several parts of the island are cultivated.

There is a stream of fresh water at the south end of Pulo Tioman which runs over a stony beach into the sea, at the foot of the Asses' Ears. From this watering place, the peak of Tingy bears S.  $\frac{1}{2}$  W., centre of Pemangil S.E.  $\frac{1}{2}$  E., highest part of Aor S.E.  $\frac{3}{4}$  E., Geeit islet S.  $\frac{3}{4}$  W., and the extremes of Tioman from East to W.S.W. Vessels seldom touch at this island, and persons landing on it must be guarded against the deceit of the natives, and ought not to penetrate into the interior.

**Tides.**—It is high water, full and change, at Tioman, at 6 h.; springs rise 7 or 8 feet, the flood tide sets to the northward, along the west side of Tioman, and the ebb to the southward, one or  $1\frac{1}{2}$  miles per hour at times.

**Islets and Rocks near Tioman.**—At 3 miles south of the Asses' Ears is a small island named Geeit, having a small islet or rock close to the southward of it.

Bara and Burong are two rocks, or small islets, lying in the fair way of the channel between Tioman and the Siribuat islands. Bara lies 6 miles westward of Geeit, with the Asses' ears bearing N.E. by E.  $\frac{1}{4}$  E., distant 7 miles; there are some rocks below water extending nearly half a mile to the northward of Bara. Burong is distant 10 miles N.W.  $\frac{1}{4}$  N. from Bara, the same distance eastward of Tioman, and 6 miles N.N.E. from the eastern Siribuat island; close to the eastward of Burong are some rocks above water.

Tolie is the largest of the islands lying off the north-west point of Tioman, from which it is distant nearly 3 miles. This island is about a mile in extent, having rocks above and below water extending about a mile to the southward of it. The channel between Tolie and the north-west point of Tioman is clear, with depths of 22 and 24 fathoms. A little more than a mile to the northward of Tolie is a small islet named Chibeh; and from 2 to 3 miles in a W.S.W. direction from Tolie, are Sepoi and Labas, two small islets, with rocks extending a short distance to the eastward of the latter.

**The COAST** from Blair harbour (page 50) recedes 6 or 7 miles in a W.N.W. direction to the Indau river; it then trends in a north-westerly direction 9 or 10 miles, to the entrance of the Pontean river; thence it curves round gradually and assumes a northerly direction as far as the entrance of the Pahang river, 48 miles to the northward of the Pontean.

**Indau River.**—The colonial steam-vessel *Pluto*, October 23rd, 1874, when crossing the bar of this river at high water, obtained depths of not less than 15 feet, the rise and fall being about 9 feet.

The average depths for a distance of 34 miles up the river are 5 to 6 fathoms. Both banks of the Indau are thickly wooded, and during heavy rains the right bank is generally submerged.\*

**Boyah Rock.**—Two small islets, named Duchong, lie nearly a mile off the coast to the southward of the Pontean river, and about 3 miles eastward of them is the Boyah rock, awash, with 4 and 5 fathoms

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\* Navigating Lieutenant B. S. Bradley, H.M.S. *Charybdis*, 1874.



water around. From the rock the entrance of the Pontean bears W.  $\frac{1}{2}$  N.,  $5\frac{1}{2}$  miles; the entrance of the Indau S. by E.  $\frac{1}{2}$  E., 6 miles; and the apex of the western Siribuat island W. by S. southerly.

**Margaret Shoal.**—The brig *Margaret*, in working to the northward along the coast, January 31st, 1827, shoaled suddenly from 6 to 4 fathoms, in about lat.  $3^{\circ} 0' N.$ , and 3 miles off shore. Tacked, had 3 fathoms in stays, and the sea broke about half a cable to leeward, the wind being strong from the N.N.E., with a heavy swell. There are two conspicuous little hills on the low land, of regular form, the northernmost of which bore W. by S., and the other S.W. by W., when the vessel was in 3 fathoms, the trees close to the beach being then visible from the deck. Between the shoal bank and the shore, there appeared to be deeper water; but as the bottom is very irregular hereabout, great caution is requisite. This shoal is placed on the chart in lat.  $2^{\circ} 59\frac{1}{2}' N.$ , long.  $103^{\circ} 30' E.$

**PULO VARELA**, in lat.  $3^{\circ} 18' N.$ , long.  $103^{\circ} 38' E.$ , 12 or 13 miles from the main, is a barren rock crowned with a few bushes, which in clear weather may be discerned about 15 miles. There is a ledge of rocks even with the water's edge, on which the sea breaks in bad weather, about  $1\frac{1}{2}$  or 2 miles nearly North from Pulo Varela, about 6 miles North and N.N.E. of which there is a rocky bank with overfalls, probably not dangerous, for the least water on it is thought to be about 5 fathoms.

Horsburgh remarks:—It might have been this bank that we got upon in the *Anna*, October 9th, 1803, returning from China. We were in 17 fathoms at sunset. Pulo Tioman in sight, bearing S.S.E.  $\frac{1}{2}$  E., stood S.W. by S., with the wind S.E., shoaling gradually to 13 fathoms at 9 P.M., and tacked; when about, steering E.  $\frac{1}{2}$  N., shoaled to 9 fathoms, hard bottom, then two casts of 7 fathoms, rocky, next cast 15 fathoms, and for a short time afterwards had overfalls from 11 to 13 fathoms, then deepened gradually in soft soundings. By computation from our observations on the preceding and following days, this bank, where we had 7 fathoms, is in lat.  $3^{\circ} 22' N.$ , and bears N.  $40^{\circ} W.$  about 40 miles from the north end of Tioman; but as Varela could not be discerned, and being night, we had not the means of determining the exact situation.

The *General Elliot* anchored upon a bank, about 9 miles E.  $\frac{1}{2}$  N. from Varela, probably that last mentioned, which, by examining with her boats, was thought to extend North and South about 3 miles, and to be about half a mile in breadth. She had 18 fathoms before getting on the edge of the bank, and the least water found upon it was 6 fathoms, coral rock.\*

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\* The soundings off the coast between Pulo Tioman and Pulo Brala are few, and no very reliable, that part not having been thoroughly surveyed.

Between it and Varela, regular soundings were found, 13 and 14 fathoms, sandy bottom, and in some places mud. The bank will be avoided, by not shoaling to less than 20 or 22 fathoms.

The channel inside Varela is considered safe ; for although the bottom is hard sand in some places, the soundings are generally regular, about 11 or 12 fathoms, near the island, and the rock to the northward of it shoaling gradually towards the main.

**PAHANG RIVER**, the entrance to which is in lat.  $3^{\circ} 34\frac{1}{2}'$  N., about 20 miles north-west of Pulo Varela, was formerly a place of great trade, and is still frequented by Chinese junks ; but it is small, very shoal, and contracted by sands, which project from the low points on each side. Pahang point bounds the river on the south side, and has breakers stretching from it to the N.N.E. nearly  $1\frac{1}{2}$  miles ; a spit of hard sand, with 3 to 6 fathoms, extends about a mile farther in the same direction, on the west side of which vessels of moderate draught may anchor in  $4\frac{1}{2}$  or 5 fathoms, clay and sand, off shore  $1\frac{1}{2}$  miles, with Pahang point bearing South or S.  $\frac{1}{4}$  E. about  $2\frac{1}{2}$  miles. Large vessels anchor at a greater distance from the shore.

The mouth of Pahang river (1875) was said to have shifted 200 yards further south since the previous year, and the sandy point to have extended further seaward. This river is wide but shallow, a vessel drawing 3 feet water would experience great difficulty in getting up to the town 7 miles from the entrance.\*

**The COAST** from the Pahang trends about N. by E. for a distance of 33 miles to a point in lat.  $4^{\circ} 8'$  N., having high land near it, between which and South cape, about 14 miles further to the northward, a bay is formed with some islands close to the shore. From South cape the coast trends about N. by W., as far as Tingeran, a distance of about 28 miles ; between are several bays, separated by Middle cape and North cape, all of which have from 9 to 10 or 11 fathoms water within 2 or 3 miles of the shore ; but the projections or capes are rocky.

A chain of mountains commences inland, nearly abreast of Pulo Varela, which converges towards the coast near South cape, and then extends along it towards Tringanu.

**Bank.**—Horsburgh observes that “between Pulo Varela and Tingeran, the coast is in general safe to approach to 8 or 10 fathoms water ; but there are frequently overfalls of one or 2 fathoms in the offing, on ridges lying parallel to the coast ; and there are some spots of 7 or 8 fathoms, sand and gravel, with 9 fathoms inside of them.” A narrow bank with 6 and 7 fathoms on it, distant 15 miles from the coast, lies about 26 miles

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\* Navigating Sub-Lieutenant M. S. Beatty, H.M.S. *Thistle*, 1875.

N.  $\frac{1}{2}$  E. from Pulo Varela, and extends from lat.  $3^{\circ} 44'$  N. about N.W. by N. to lat.  $3^{\circ} 50'$  N.

In lat.  $3^{\circ} 51'$  N., Captain W. Owen, in 1807, steering S. by E.  $\frac{1}{2}$  E., shoaled from 13 to 11, 9, 8, and  $7\frac{1}{2}$  fathoms, hauled out E.S.E., and deepened fast to 8, 10, 12, and 16 fathoms; being night when these shoal soundings are obtained, the position assigned to them is by computation, but they were probably on the bank last mentioned.

**Howard Shoal** was passed over by Mr. Howard, commanding the ship *Janet Hutton*, in 1823, in lat.  $4^{\circ} 17'$  N., long.  $103^{\circ} 38\frac{1}{2}'$  E., bearing S.E.  $\frac{1}{2}$  E. 6 miles from the river Camaman;\* upon this shoal he got 2 fathoms, rocks, and was informed by the Malay fishermen that there is only one fathom on its centre.

**Windsbrant Shoal**, with 15 feet water, in lat.  $4^{\circ} 25'$  N., long.  $103^{\circ} 24'$  E. (approximate), lies about  $1\frac{1}{2}$  miles from the shore, between South and Middle capes.

**Tingeran River**, the entrance to which is in lat.  $4^{\circ} 49'$  N., is formed close under the south side of Rocky point, the latter being about 12 miles West from Pulo Brala; this river is barred by rocks.

**Pulo Brala**, in lat.  $4^{\circ} 49'$  N., long.  $103^{\circ} 38'$  E., distant 12 or 13 miles from the main, is of considerable size, and may be seen 30 or 32 miles off in clear weather; when it bears S.  $\frac{3}{4}$  W. its summit is flat, but appears in hummocks when bearing to the south-west and westward. There is a black rock or islet one or 2 miles distant from its southern extreme, and three islets off its north-western extreme, the outer one being distant nearly 6 miles.

Between this island and the coast opposite, about Rocky point, the soundings are irregular in some places, and the bottom rocky, or sandy; but in other places regular sounding are found over a bottom of soft mud. The channel is about 12 miles wide, and safe, by not borrowing under 11 or 10 fathoms towards the main, nor nearer to Brala than 19 or 20 fathoms. The depths outside Brala are 34 and 35 fathoms to the north-eastward and eastward, 13 or 14 miles distance.

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\* The river Camaman is probably the river immediately to the northward of South cape, as the bearing and distance of the shoal from South cape agrees nearly with those given in the text from the Camaman river.

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## CHAPTER IV.

MAIN ROUTE TO CHINA. DESCRIPTION OF ISLANDS,  
REEFS, AND SHOALS.

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VARIATION,  $1\frac{1}{2}^{\circ}$  to  $1\frac{1}{2}^{\circ}$  East in 1879.

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Directions for making the passage by the Main route to and from China are given in pages 8 and 14; we now proceed with a description of the islands and shoals in this route.\*

## EASTERN SIDE OF MAIN ROUTE.

**Charlotte Bank**, with 5 to 8 fathoms water, and 40 to 41 fathoms close around, in lat.  $7^{\circ} 7' 19''$  N., long.  $107^{\circ} 36' 52''$  E., is  $3\frac{1}{2}$  miles long east and west, and 2 miles broad.

When near the parallel of this bank a vessel will pass westward of it by keeping in less than 30 fathoms water.

**VANGUARD BANK**, having 9 fathoms least water, and general depths of 20 to 60 fathoms, is crescent-shaped, about 37 miles long, with an average breadth of 6 miles. The horns of the crescent are respectively in lat.  $7^{\circ} 16\frac{1}{2}'$  N., long.  $109^{\circ} 26'$  E., and lat.  $7^{\circ} 31'$  N., long.  $109^{\circ} 57'$  E., the convex curve being on the north-west side, and reaching to the parallel of  $7^{\circ} 36'$  N.

**Grainger Bank**, lying 33 miles north-eastward of the Vanguard, is  $5\frac{1}{2}$  miles long, N.E. and S.W., and  $2\frac{1}{2}$  miles broad at its widest part. There are 6 fathoms least water, with general depths of under 20 fathoms on this bank, which is composed of coral, visible over nearly the whole it. The centre is in lat.  $7^{\circ} 47\frac{3}{4}'$  N., long.  $110^{\circ} 29'$  E.

**PRINCE CONSORT BANK** (discovered by the *Rifleman*, 1865), lies between the Vanguard and Prince of Wales bank, and extends from  $7^{\circ} 46'$  N. to  $7^{\circ} 58'$  N., and from  $109^{\circ} 55'$  to  $110^{\circ} 6'$  E. No danger exists on it; the general soundings are from 30 to 50 fathoms, sand and coral, the least water found being on a small coral patch of 10 fathoms.

**PRINCE OF WALES BANK**, in lat.  $8^{\circ} 8\frac{1}{2}'$  N., long.  $110^{\circ} 32\frac{1}{2}'$  E., is 12 miles in extent N.E. and S.W., and  $7\frac{1}{2}$  miles broad; this bank is of coral formation with irregular soundings of 8 to 37 fathoms, and 4 fathoms near its north-west corner.

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\* See Admiralty charts :—China sea, Nos. 2,660 a and b; 2,661 a and b, scales,  $m = 0.05$  of an inch; and Indian ocean, northern portion, No. 7,486, scale  $d = 3.5$  of an inch.

**Alexandra Bank**, in lat.  $8^{\circ} 1\frac{1}{2}'$  N., long.  $110^{\circ} 36\frac{3}{4}'$  E., is 5 miles in extent north and south, and  $3\frac{1}{2}$  miles broad. A small patch with only 3 fathoms water on it, was found close to the eastern edge, but no other dangers exist; the average depth on the bank is about 15 fathoms; the bottom coral, distinctly visible.

**RIFLEMAN BANK** lies between the parallels of  $7^{\circ} 31'$  and  $7^{\circ} 57'$  N., and the meridians of  $111^{\circ} 32'$  and  $111^{\circ} 45\frac{1}{2}'$  E. Shoal patches were found round its edges, one of which (*Bombay Castle*), with 11 feet water and half a mile in extent, lies on its northern edge in lat.  $7^{\circ} 55' 20''$  N., long.  $111^{\circ} 42'$  E.; with this exception, 4 fathoms was the least depth obtained on the bank. In the centre of the bank the soundings are from 20 to 40 fathoms, sand and coral; and around its edge, outside, a few soundings were obtained varying from 300 to 600 fathoms.

It is probable that the 11-feet patch on the north edge of this bank is the shoal observed by Mr. Cameron, commanding the *Orleana*, who obtained a depth of 8 feet, and placed the danger in lat.  $7^{\circ} 56'$  N., long.  $111^{\circ} 38'$  E. The 8-feet knoll was not found by the *Rifleman's* boats, but it is quite possible to have escaped the lead, for large isolated rocks are known to exist on coral reefs, though extremely difficult to find. Heavy breakers mark the position of this patch, except in the finest weather.

The *Rifleman* sounded over the position assigned to the *Bombay Castle* reef, in lat.  $7^{\circ} 56'$  N., long.  $111^{\circ} 51'$  E. but no bottom could be obtained with upwards of 100 fathoms of line; nor could any sign of shoal water be seen from the mast head under most favourable circumstances, when on, and cruising around its supposed position; it is therefore deemed probable that the *Bombay Castle* must have sighted the 11-feet patch on the *Rifleman* bank, as the latitude is nearly the same, though the longitude differs 9 miles.

**Amboyna Cay**, in lat.  $7^{\circ} 51\frac{3}{4}'$  N., long.  $112^{\circ} 55'$  E., situated at the south-west extreme of a small coral bank, is 150 yards long E.N.E. and W.S.W., 124 yards wide, and 8 feet high. It is surrounded by coral ledges, some of which dry at low water, but in no instance do they extend as far as 2 cables from high-water mark; the sea breaks heavily upon these ledges in any swell.

About two-thirds of the rock forming the cay is covered with a rich coat of guano, in some places 4 feet deep, the deposit of myriads of boobies, petrels, and other marine birds; the rest of the cay is comminuted coral. A large pile, composed of all the drift-wood to be collected on the cay, a few lumps of coral, &c., was erected in the centre, and can be seen as a sail at a distance from 5 to 7 miles in clear weather.

The bank, to the north-eastward of the cay, forms a very narrow ridge a mile long by 2 cables wide; the soundings upon it are about 4 fathoms

from a quarter of a mile from the reef until close to the end of the spit, when the water deepens rapidly from 9 to 17 fathoms, thence 67 fathoms, no bottom; while at a distance less than a third of a mile, no bottom was obtained with 220 fathoms of line. There is no danger on the ridge if vessels do not get into less than 4 fathoms, although from the clearness of the water the bottom appears close to the ship's keel; the ledges surrounding the islet are steep-to.

Anchorage on the ridge in 5 fathoms, in the south-west monsoon, was obtained by the *Rifleman*, fairly sheltered from the prevailing wind. Fish appeared to be abundant, but only a few were caught.

**Tides.**—By observations at Amboyna cay two days before neaps, the maximum rate of tide was 1.4 knots per hour, the flood stream setting about N. by W., the ebb West; flood commencing at 11 p.m., and the ebb at 6 a.m.; rise and fall doubtful.

**Owen Shoal**, in lat.  $8^{\circ} 8' N.$ , long.  $111^{\circ} 59' E.$ , was discovered in 1835, by Mr. Owen, commanding the ship *David Scott*, who had soundings of 6 to  $4\frac{1}{2}$ , and one cast of  $3\frac{3}{4}$  fathoms in passing over it, a little past noon, steering S.S.E., and at 1 p.m. cleared the shoal, having then no bottom. The shoal appeared to be about 2 miles in extent, consisting of black and white speckled coral, in a state of rapid accretion, apparently by the vitality and energy of the madrepores, observed in recent formations of large pieces of coral brought up by the lead. The patches of speckled coral were bright and alarming while on the shoal, and although no breakers were perceived, as the sea was then very smooth, yet with a heavy swell, the sea probably rises in rollers over the shoal patches, when a large vessel would be liable to strike on some of them.

**Stags Shoal**, the north end of which is said to be in lat.  $8^{\circ} 24' N.$ , long.  $112^{\circ} 57' E.$ , was seen by Mr. Trinder, in the brig *Amboyna*, 1802, and named by him from the resemblance of the rocks to the horns of a stag. No soundings were obtained at 80 fathoms, within a quarter of a mile of the north end of the shoal, which extended S.E. and S.S.W. in form of a triangle, with rocks above water, and breakers on various parts, the intermediate space apparently very shoal, and the southern extremity could not be discerned from the mast-head.\*

The *Rifleman* in 1868, obtained 1085 fathoms, oaze, in the position assigned to Stags shoal.

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\* H.M.S. *Renard* got upon the position ascribed to the Stags, and steered a few miles East and West, but could not discover them. Commander Ward, R.N., found Amboyna cay to be 11 miles farther west than reported by Mr. Trinder, commanding the *Amboyna*, who discovered both dangers; and it is possible, therefore, that the position of the Stags given in the text may be 11 or 12 miles to the eastward of the truth.

**Ladd Reef** (Rob Roy reef), the eastern extreme of which is in lat.  $8^{\circ} 40\frac{1}{4}'$  N. long.  $111^{\circ} 41'\frac{1}{4}$  E., is a coral bank 3 miles long E.N.E. and W.S.W., and a mile across its broadest part, which is at its eastern end. In the centre of the reef is a lagoon with a bottom of clear white sand, which shows with remarkable distinctness. The surrounding reef uncovers at half tide in many places, and at low water it is almost impossible for boats to cross over into the lagoon.

**Spratly Island**, bearing E.  $\frac{1}{2}$  S. distant 14 miles from Ladd reef, is evidently identical with the Storm island of Horsburgh, as no other island exists in this vicinity. It is a flat islet, about 8 feet high, 500 yards long and 300 yards broad, with a margin of bright white sand and broken coral, which, when the sun is shining on it, is conspicuous from the mast-head at a considerable distance. It was described by Mr. Spratly, commanding the *Cyrus*, whaler, as "a low sandy island, the top appearing to be covered with bushes."\* Commander Ward says that not a bush or even a blade of grass is to be found upon it, and the appearance described by Mr. Spratly was no doubt the effect of the mirage, which exaggerates the size and distorts the appearance of the drift-wood on the beach and the sea birds which throng it. At a distance of 3 or 4 miles, the birds standing erect look very like small bushes.

Spratly island † is on the west side of a coral bank, which is  $1\frac{1}{2}$  miles long N.E. and S.W., and three-quarters of a mile broad. Northward of the island at three-quarters of a mile distant, there are  $3\frac{1}{2}$  fathoms close to the edge of the bank decreasing towards the shore. North-eastward there are 7 or 8 fathoms not quite half a mile from the island. Rocky ledges, dry at low water, surround this island, rendering it necessary to be cautious when landing, which during the south-west monsoon may be effected on the lee side. The bank is steep-to, the sea breaking heavily upon it in the south-west monsoon, except in very fine weather.

The *Rifeman* anchored in about 6 fathoms on the north-east point of the bank, fairly sheltered from the S.W.; with the extremes of the island bearing S.W.  $\frac{1}{2}$  S., and S.W. by W.  $\frac{1}{2}$  W., and the extreme of the breakers on the western edge W.  $\frac{3}{4}$  S.

In the months of June and July the islet swarmed with turtle of a very fine description, and they may possibly frequent it at other seasons. Large numbers were taken, being easily turned over by two or three men on the beach, in the evening or night, and occasionally in

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\* Nautical Magazine, 1843, p. 697.

† A square beacon was erected by Commander Ward on this islet. It is formed with four uprights of rough drift-wood spars, 27 feet high and 15 feet apart. The uprights are shored up, and the centre space solidly filled in and built up to a height of 15 feet with drift-wood, rubble, &c.

the daytime: they are apparently identical with the green turtle of Ascension. Immense quantities of their eggs were found on the south-west side of the islet. Fish were numerous, but few were caught. Sea birds' eggs literally covered the ground.

**Tides.**—Observations at Spratly island in the south-west monsoon showed but one tide during the 24 hours, and in the early part of July it was found to be high water at 9 h. a.m., the rise and fall being  $5\frac{1}{4}$  feet. No observations up to the present time have been obtained during the north-east monsoon, which probably creates a great change. The direction of the stream at the north-east corner of the bank was S.W. during the rising tide, and S.E. to E.N.E. during the falling tide.

**WEST LONDON REEF**, bearing E. by N.  $\frac{3}{4}$  N. distant 31 miles from Ladd reef, is  $4\frac{1}{2}$  miles long, N.E. by E. and S.W. by W.,  $3\frac{1}{4}$  miles broad; several of the coral heads surrounding this reef dry at low water. On the centre of the reef there are 6 to 10 fathoms water, with several shoal spots. The only approach to the centre is from the south-east side, but so many coral patches exist that the navigation is extremely hazardous. On the east side of the bank, in lat.  $8^{\circ} 52' 51''$  N., long.  $112^{\circ} 15' 28''$  E., is a sandy cay, a quarter of a mile in extent N.E. and S.W., 26 yards broad, and 2 feet above high water.

**CENTRAL LONDON REEF**, the centre of which is in lat.  $8^{\circ} 55\frac{1}{2}'$  N., long.  $112^{\circ} 20'$  E., was discovered by the *Rifleman* whilst sounding between the East and West London reefs. It is a coral patch, awash, half a mile in extent, with a shallow lagoon inside the belt of coral. On the south-west extreme of the reef is a sandy cay, 60 or 70 yards in circumference, which is probably covered at high-water springs.

This is a dangerous reef, and lies directly in the track of vessels working up or down the China sea. Being small, it is not marked by breakers, like those which so readily point out the positions of East and West London reefs.

**Caution.**—Like most dangers in the China sea, the Central London reef is surrounded by deep water, thus rendering the lead useless; great caution is therefore necessary when navigating in their vicinity, and not to stand towards them with the sun shining ahead, as under these circumstances it becomes almost impossible to distinguish shoal water or breakers.

**EAST LONDON REEF** is 7 miles long, east and west, from one to 2 miles broad, and its east end is in lat.  $8^{\circ} 49' 38''$  N., long.  $112^{\circ} 38' 16''$  E. The coral round it edges encloses a lagoon, having 4 to 8 fathoms water. No entrance into the lagoon could be discovered, but there are apparently numerous shoal patches inside. The sea breaks heavily on the reef, and



on its western extreme are one or two rocks which seldom cover. No soundings could be obtained with 100 fathoms of line at one mile from where the coral dries, nor with 500 fathoms at 2 miles north of it.

**Cuarteron Reef**, named after the Spaniard who discovered it, is awash, crescent shaped, curved to the southward, the distance between the horns being 3 miles E. by S. and W. by N. Its eastern extreme is in lat.  $8^{\circ} 50' 54''$  N., long.  $112^{\circ} 50' 8''$  E.

The reef was found steeper-to than any yet visited, for although deep water is found close to all of them, there was generally some slope from the rocks awash, on which the *Rifleman* could anchor with safety for a short period, to enable the position to be fixed; here, however, although she anchored in 5 fathoms, with the jib-boom over the rocks awash, the reef was so steep as to cause the anchor to roll down the incline, and run the cable out to the clinch. Captain Ward is opinion that no vessel should ever venture to sight this reef.

**The Fiery Cross or N.W. Investigator Reef** is an extensive coral reef having several dry patches, upon most of which the sea breaks even in light winds, or with a slight swell. It is 14 miles in length N.E. by E. and S.W. by W., and 4 miles in breadth. Its south-west end is in lat.  $9^{\circ} 32'$  N., long.  $112^{\circ} 50'$  E., and its north-east end in lat.  $9^{\circ} 41'$  N., long.  $113^{\circ} 2'$  E. The largest dry patch is at its south-west end, and here were found the wrecks of two vessels, supposed to have been those of the *Fiery Cross* and *Meerschaum*, both of which are known to have been lost upon this reef.\*

**Discovery Great Reef**, the south end of which is in lat.  $10^{\circ} 0' 42''$  N., long.  $113^{\circ} 51\frac{1}{2}'$  E., is a long narrow coral shoal, the greater part of which dries at low tides, with several large rocks upon it which always show above water; in the centre is a lagoon, which appeared to be shallow, and to have no passage leading into it. From the south

\* The schooner *Dhaulie*, 1826, anchored at night on a shoal of 3 fathoms, which, on the following morning, appeared to be about one or 2 miles in circumference. At noon of the preceding day, the *Dhaulie* had passed a mile to the westward of what was supposed to be West London reef, and thence had steered N. by E.  $\frac{1}{4}$  E., 42 miles, until she anchored in 3 fathoms on the shoal; this run would place it in  $9^{\circ} 32'$  N., and  $112^{\circ} 24'$  E.

The *Rifleman* was employed a whole day in searching over and about that locality, with a heavy swell and light breeze, circumstances favourable for the discovery of shoals in deep water, but no shoal could be found; on the presumed locality bottom of dark ooze was brought up from a depth of 1,060 fathoms.

The London reefs, were, until the *Rifleman's* survey, 1868, placed upon the charts very much out of their correct positions, and it seems probable that the reef passed to the westward by the *Dhaulie* was either the East London or the Cuarteron, and that the shoal anchored on was one of the shoal patches of the Fiery Cross reef, in the same latitude as that ascribed to the Dhaulie shoal.

point the reef trends North, 5 miles, then N. by E., 5 miles, it is a mile broad at the south end and half a mile at the north. No bottom was found with 100 fathoms line within a short distance of any part of the reef except off its north end, where the *Riflemen* anchored in 42 fathoms, nearly half a mile from the rocks; a third of a mile off its south-west point a sounding of 192 fathoms, sand and coral, was obtained.

The Hainan fishermen report a reef or shoal lying 10 miles north-eastward of Discovery Great reef, but that locality, not having been examined, should be avoided.

**Discovery Small Reef**, in lat.  $10^{\circ} 1\frac{1}{2}'$  N., long.  $114^{\circ} 1\frac{1}{2}'$  E., is a small round coral patch, a third of a mile in diameter, dry in places at low tides, with very deep water all round. Soundings of 174 and 180 fathoms, sand and coral, were obtained very close to its eastern side, and no bottom at 210 fathoms the same distance off the opposite side.

**Western or Flora Temple Reef**, the centre of which is in lat.  $10^{\circ} 15'$  N., long.  $113^{\circ} 37'$  E., is the westernmost reef in this part of the China sea, and very dangerous, having patches of rock just under water at the south-west part, and but one to 3 fathoms in other places. It is  $1\frac{1}{2}$  miles long N.E. and S.W., and rather more than half a mile broad at the southern part, decreasing to half that breadth at the opposite end. The *Riflemen*, for the purposes of the survey, anchored in 5 fathoms on its north-eastern extreme, which had to be approached with great caution, as shoal water was seen at a very short distance inside the edge; soundings of 18 to 74 fathoms were obtained close to, but at a short distance off, no bottom at 100 fathoms.

**TIZARD BANK, with REEFS and ISLANDS.**—From Discovery Small reef the nearest part of this bank bears N.E. by E., 16 miles. It, like the generality of the large coral banks in the China sea, consists of a lagoon bordered by shoal patches, several of which are dangerous reefs, dry at low water, two with islands on them, and a third a sand cay. The bank lies in an E.N.E. and W.S.W. direction, and extends nearly 31 miles, its breadth at the north-east part being 11 miles, and at the opposite end  $3\frac{1}{2}$  miles.

**Itu-Aba**, the larger of the two islands, lies at the north-west corner of the bank, and is three-quarters of a mile long, E. by N. and W. by S., and a quarter of a mile broad. The reef surrounding it extends in some places nearly half a mile, and in others not so far; its limits, however, are generally defined by a line of breakers. The island is covered with small trees and high bushes, with numerous nests of sea birds. There are two or three cocoa-nut and a few plantain trees near a small well, but the most conspicuous object is a single black clump tree, on the north side of

the island, which may be distinctly seen 10 miles off ; this tree is in lat.  $10^{\circ} 22' 42''$  N., long.  $114^{\circ} 21' 11''$  E.

A little more than 6 miles, East, from Itu-Aba island is a small sand cay, nearly in the centre of a round-shaped reef three-quarters of a mile in diameter. The island and cay are connected by a line of shoal patches, which form the north-east part of the bank ; and nearly midway between, but nearer the island, is a dangerous reef, entirely covered at half-tide, about the same size as that surrounding the cay. Elsewhere on the northern edge of the bank there are not less than 4 fathoms, and vessels may safely anchor in 7 to 11 fathoms about  $1\frac{1}{2}$  miles westward of the sand cay, midway between it and the reef last described.

**Petley Reef**, an oval-shaped patch a little over a mile in extent, lies E. by N.  $\frac{3}{4}$  N.  $5\frac{1}{4}$  miles from Sand cay ; it forms the extremity of a remarkable strip of coral,  $1\frac{1}{4}$  miles wide, projecting in a N.N.E. direction from the main body of the bank, the edge of which trends E.S.E. from the cay ; not less than 6 fathoms was found upon the strip, except within a mile of the southern part of the reef above mentioned, where it shoals to 4 and 3 fathoms, and no bottom could be obtained with 100 fathoms at a short distance on either side of it.

**Eldad Reef**, the north-east end of which is in latitude  $10^{\circ} 23'$  N., longitude  $114^{\circ} 42'$  E., forms the eastern extreme of Tizard bank. It is  $4\frac{1}{2}$  miles long, N.N.E.  $\frac{1}{2}$  E. and S.S.W.  $\frac{1}{2}$  W., the southern and middle parts being about  $1\frac{1}{2}$  miles wide, but of irregular outline ; and the northern part tapering away in the form of a long narrow tongue, on either side of which no bottom could be obtained with 100 fathoms of line. A few large rocks are visible at high water, and at low water many smaller ones uncover. Shoal patches extend nearly three-quarters of a mile to the westward of the reef.

**Nam-yit Island**, lying South  $11\frac{1}{4}$  miles from Itu-Aba, is 600 yards long East and West, 200 yards broad, and surrounded by a reef which projects more than a mile to the westward, and about a third of a mile in other directions.

**Gaven Reefs** are two dangerous reefs, covered at high water, lying westward of Nam-yit ; the easternmost is three-quarters of a mile long, N.N.W. and S.S.E., Nam-yit island bearing from it E.  $\frac{7}{8}$  N., distant 6 miles ; the westernmost is a mile long North and South, and nearly three quarters of a mile broad at its northern end, narrowing to a point at the opposite end ; its outer edge is in lat.  $10^{\circ} 13' 20''$  N., long.  $114^{\circ} 13' 7''$  E.

**Anchorage**.—The above comprise the whole of the dangers found on Tizard bank, and with the exception of a 3-fathoms patch about a mile north-east of Nam-yit, nothing less than 4 fathoms was discovered on any of the shoal patches surrounding the lagoon ; so that vessels of moderate draught

can, in cases of necessity, and in fine weather, find convenient anchorage, observing always due care and caution in approaching them, so as to guard against possible danger from some shoal spot having escaped detection by the lead.\*

**LOAI-TA BANK** extends 21 miles N.E. and S.W.; its southern part is  $5\frac{1}{2}$  miles wide, and its centre 7 miles; from thence it gradually narrows to a point at its north-east extreme.

**Loai-ta Island** (South island of Horsburgh) lies N.  $\frac{3}{4}$  E., distant 18 miles from Itu-Aba, its north-west entrance being in latitude  $10^{\circ} 40' 45''$  N., longitude  $114^{\circ} 24' 54''$  E. It is a low sand island, 300 yards in diameter, covered with bushes, and surrounded by a reef extending in some places nearly half a mile.

A reef, about  $1\frac{1}{2}$  miles in extent, dry at low water, and having a small sand cay near the centre, lies 5 miles north-westward of Loai-ta island. Another and larger reef lies three-quarters of a mile to the south-westward of the one just mentioned, extending in that direction  $1\frac{1}{2}$  miles, its width being about a mile. The south-west extreme of this last reef, which is also the south-west extreme of Loai-ta bank, is in  $10^{\circ} 42'$  N., and  $114^{\circ} 19'$  E.; the sand cay bearing N.E. distant nearly 3 miles, and Loai-ta island E. by S. 6 miles.

From the sand cay above mentioned, the north-western edge of the bank trends away E.N.E. 5 miles, and then N.E. 13 miles; no less than 4 fathoms was found anywhere upon this part of the bank.

**Lan-keeam Cay and adjacent Reefs.**—A coral patch, half a mile in extent, which partly dries at low water, lies E. by N. 2 miles from Loai-ta island; and E.N.E.  $6\frac{1}{4}$  miles from the same island is a larger reef, three quarters of a mile in diameter, having a sand cay near its centre: this cay, known to the Hainan fishermen as Lan-keeam, is in lat.  $10^{\circ} 43' 20''$  N., long.  $114^{\circ} 31'$  E.

At 3 miles N.E. by E.  $\frac{1}{2}$  E. from Lan-keeam, is a small dry patch which forms the south-east angle of the great Loai-ta bank, and N.E.  $\frac{1}{4}$  N.  $4\frac{1}{4}$  miles from that cay is another small reef; this is the northernmost patch which dries.

From the reef just mentioned, the south-eastern edge of the bank

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\* Hainan fishermen, who subsist by collecting trepang and tortoise-shell, were found upon most of these islands, some of whom remain for years amongst the reefs. Junks from Hainan annually visit the islands and reefs of the China sea with supplies of rice and other necessaries, for which the fishermen give trepang and other articles in exchange, and remit their profits home; the junks leave Hainan in December or January, and return with the first of the south-west monsoon. The fishermen upon Itu-Aba island were more comfortably established than the others, and the water found in the well on that island was better than elsewhere.

trends N. by E. about 9 miles, when it meets the north-western edge : nothing less than 4 fathoms was obtained on this part of the bank.

**Soubie reef**, the south-west end of which is in lat.  $10^{\circ} 53\frac{1}{2}'$  N., long.  $114^{\circ} 3' 40''$  E., is the westernmost danger in this locality. It is an irregular-shaped coral reef, nearly  $3\frac{1}{2}$  miles long, N.E. and S.W., and 2 miles broad, is dry at low water, and has a lagoon, into which there appears to be no passage.

**THI-TU REEFS and ISLAND** (the N.W. Dangers of Horsburgh), consist of the several very dangerous patches grouped upon two coral banks, separated by a narrow deep channel. Thi-tu is a low sand island, not quite half a mile in diameter, situated near the centre of the dangers on the southern part of a reef, which dries at low water, and which extends three quarters of a mile eastward of the island, forming in that direction the extreme of the western bank. Near its south-west end is a dark clump tree in lat.  $11^{\circ} 3' 9''$  N., long.  $114^{\circ} 16' 25''$  E.; in addition to this clump tree the island has upon it some low bushes and two stunted cocoa-nut trees, near to which is a small well and a few plantain trees. (1867).

From the island the western bank widens out in directions N.W. and S.W. for a distance each way of  $2\frac{1}{2}$  miles ; the north side of this part of the bank is marked by a round coral reef, three-quarters of a mile in diameter, between which and the reef surrounding the island are soundings of  $2\frac{1}{2}$  to 7 fathoms, the deep water being nearer the island. The south edge of the bank is also marked by a reef, but this is much smaller than the one just described, and the depths between it and the island are more favourable for anchoring upon than the opposite side of the bank, being in no place less than  $4\frac{1}{2}$  fathoms. From these two reefs the bank gradually narrows, and terminates in a point in lat.  $11^{\circ} 2' 30''$  N., long.  $114^{\circ} 10' 30''$  E. the island bearing E.  $\frac{3}{4}$  N., distant 6 miles.

On the north edge of the bank is a sand cay which bears from the island W.  $\frac{1}{3}$  N., nearly  $3\frac{1}{2}$  miles. This is also on a large patch of reef, dry at low water, and between it and the western extreme of the bank are dangerous reefs, nearly always marked by breakers. There is a passage into the lagoon between the sand cay reef and the one  $2\frac{1}{2}$  miles N.W. of the island, with depths of 5 to 12 fathoms.

The south side of the bank is not nearly so dangerous as the north side, and vessels may anchor upon it with the sand cay bearing between N.E. by N. and N.W. by N., or to the eastward of the patch which lies S.W.  $2\frac{1}{2}$  miles from the island, with the cay bearing N.W. by W.  $\frac{1}{2}$  W., and the island N.E.  $\frac{1}{2}$  E. In the lagoon the depths are 17 to 19 fathoms.

The eastern bank is a mass of dangerous reefs and patches ; its western extreme is more than a mile eastward of Thi-tu island, extending

from thence  $1\frac{1}{2}$  miles East and  $3\frac{1}{2}$  miles N.E., with an average breadth of 2 miles.

**Trident Shoal**, lying E. by N. 16 miles from North Danger, is composed of coral  $7\frac{1}{2}$  miles long and 6 miles broad; there are many patches on this shoal with less than 10 fathoms water over them, two of which are dangerous. These patches lie round the edges of the shoal, forming a lagoon, the depths in which are 26 to 37 fathoms; close outside of them, there is no bottom at 100 fathoms.

The most dangerous patch, situated at the northern extreme of the shoal, extends  $1\frac{1}{4}$  miles East and West, and half a mile North and South, having near its centre, in lat.  $11^{\circ} 31' 30''$  N., long.  $114^{\circ} 39' 15''$  E., a small spot which dries at low water springs; the depths on other parts of the patch vary from  $1\frac{1}{4}$  to 6 fathoms. The other patch is at the eastern extreme of the shoal, and is distant  $3\frac{1}{2}$  miles S.E.  $\frac{1}{2}$  S. from that just described; it is a small spot of  $2\frac{1}{4}$  fathoms, with depths of 3 to 5 fathoms at half a mile around it; depths of 4 fathoms were obtained about a mile W. by S. from the dry spot, but not less than 5 fathoms on any of the other patches.

**Lys Shoal** lies 2 miles southward of Trident shoal, and like the latter is formed of a number of patches under 10 fathoms, with a lagoon in the centre; only one danger, a small spot of 17 feet, was found, and this lies near the south-west extreme of the bank, in lat.  $11^{\circ} 19' 40''$  N., long.  $114^{\circ} 34' 24''$  E.; around it the depths are 5 fathoms. Some 5-fathom patches were also discovered near the north-east end of the bank, but nothing under 6 fathoms was met with elsewhere, the general depths on the patches being 7 to 10 fathoms, and a short distance outside of them bottom was not reached with 100 fathoms of line.

**North Danger Reef**, of coral formation, is about  $8\frac{1}{2}$  miles long, N.E. and S.W., and  $4\frac{1}{2}$  miles broad. On its north-west side are two sandy cays, the north-eastern of which is half a mile long, one quarter of a mile broad, and 10 feet high; the south-western cay is nearly half a mile long, 300 yards broad, and 15 feet high. Between the cays is a passage one mile wide, with 4 to 9 fathoms water, leading into the lagoon of the reef, where the depth is 20 to 25 fathoms.

Shoal water exists all round the edge of North Danger reef, and there are heavy breakers over the coral, awash at its north-east and south-west extremes. No soundings could be obtained close to the edge of the reef with upwards of 100 fathoms of line, but there is a depth of 380 fathoms at  $1\frac{1}{2}$  miles north-east of the breakers on its north-east extreme. On the eastern side of the reef no bottom could be obtained with 450 fathoms of line.

Both cays are covered with coarse grass, and on the north-eastern

of the two is a stunted tree in lat.  $11^{\circ} 28' N.$ , long.  $114^{\circ} 20\frac{3}{4}' E.$  The cays are frequented by Chinese fishermen from Hainan, who collect beche-de-mer, turtle-shell, &c., and supply themselves with water from a well in the centre of the north-eastern cay.

**Caution.**—Vessels should not attempt to pass through the reefs in this part of the China sea, as a line of dangerous shoals, extending many miles, is known to exist eastward of the dangers just described.

**Currents and Tides.**—Whilst the *Rifleman* was at anchor on the reefs, during both monsoons, careful observations were taken of the set of the current, which, for 16 hours out of the 24, invariably set to windward, generally with the greatest force when the monsoon was strongest.

The rise of tide at springs was about 5 feet, and at neaps one to 2 feet one tidal steam in 24 hours.

#### WESTERN SIDE OF MAIN ROUTE.

**Scawfell Shoal.**—Mr. Thompson, commanding the ship *Scawfell*, reports as follows:—"On the 13th of May 1865, on my passage up the China sea, just before noon I observed an unusual quantity of fish around the ship, and while taking noon observations, rocks were reported under the bottom. I immediately got a cast of the lead, and had 9 fathoms, the lead tumbling off the coral gave half a fathom more. The water was very smooth at the time, the vessel having just steerage way, with a very light air from the north-east. Other casts of the lead gave  $7\frac{1}{2}$  fathoms until about the middle of the shoal, when the lead got fast between the coral rocks and was lost; this part appeared as shoal as any that was visible round the ship. Got another lead ready as soon as possible, when we had 17 fathoms, then losing sight of the bottom the ship drifting to the N.N.W. with a slight northerly current about a knot an hour. On sounding an hour later, the ship going in the same direction at the same rate, had 22 fathoms; one hour afterwards 29 fathoms, this last being 5 or 6 miles north-westward of the shoal.

"The noon observations taken on the shoal gave lat.  $7^{\circ} 19' N.$ , and by mean of forenoon and afternoon sights for chronometer, made the longitude of the shoal to be  $106^{\circ} 51' E.$  Made Pulo Condore next day, and by that island, together with observations taken in Sunda and Gaspar straits, the chronometers appeared to be quite correct."

It will be seen that the position of this shoal is about as far to the westward of the usual track of shipping proceeding up or down the China sea before a fair monsoon as the Charlotte bank is to the eastward of it. Lying so near the fairway, it appears extraordinary that it has not been before observed.

H.M.S. *Egeria*, 1875, passed over the reported position of Scawfell shoal, without seeing any indication of shoal water.\*

**Banda Shoal**, with 18 feet water, reported in 1871, lies in lat.  $8^{\circ} 0' N.$ , and long.  $107^{\circ} 0' E.$

**The Brothers** are two small islands, about  $2\frac{1}{2}$  or 3 miles apart, N.E. by E. and S.W. by W., lying about 10 miles eastward of Pulo Obi, and nearly 40 miles from the coast of Lower Cochin China. The westernmost, in lat.  $8^{\circ} 34' N.$ , long.  $106^{\circ} 11' E.$ , is a barren rock, not more conspicuous than Pedra Branca at the entrance of Singapore strait, and has high breakers on its eastern side during blowing weather. The easternmost is a high round islet, with trees on its summit, bearing W. by S. 18 miles from Pulo Condore.

**PULO CONDORE GROUP**† (named Con-non by the Cochin Chinese), lies about 50 miles from the coast of Cambodia or Lower Cochin China, and 60 or 70 miles to the westward of the fair track of vessels bound up or down the Main route of the China sea, but right in the track of those proceeding between Singapore and Saigon. The principal island is nearly 9 miles in length N.E. and S.W., from 2 to 4 miles in breadth, and the head of the landing place at the village in Great bay on its south-east side is in lat.  $8^{\circ} 40' 57'' N.$ , long.  $106^{\circ} 36' 11'' E.$ ‡ It is encompassed by several islands much smaller, which are mostly all high and covered with trees, and is formed of a ridge of mountains, the summit of the highest of which is elevated 1,954 feet, and has been seen 50 miles off in clear weather. The island is thinly inhabited by people from Cambodia and Cochin China, who reside in a village on a plain at the bottom of Great bay. The French are in possession of the island, which they make use of as a penal settlement.§

The approaches to Pulo Condore are safe. The coral banks only occur near the shores, and more particularly in those parts that are sheltered from both monsoons.

**Great or East Bay**, is formed by the projection from the main body of the island of two high points of land, which are about 4 miles apart. Off the southern point four islets extend nearly  $1\frac{1}{2}$  miles to the eastward, and the bay is fronted in that direction by an island,

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\* Navigating Lieutenant W. H. Stephens, H.M.S. *Egeria*, 1875.

† See Admiralty chart:—Pulo Condore group, with views No. 1,000; scale,  $m = 1.5$  inches.

‡ The mean of observations obtained in 1862 by the officers of H.M. surveying vessels *Swallow* and *Rifleman*.

§ The English settled and built a fort here in 1702; and a few years afterwards were almost all cut off in the night, by Macassar soldiers in their employ.



named Haon Bai Kan, having an islet off its south side, named Haon Lap.

There are three passages into this bay; that between the southern point and the islets to the eastward of it, although but a quarter of a mile wide, is safe, with depths of 20 and 16 fathoms, decreasing to 9 and 7 inside. The passage between the islets and Haon Bai Kan is about  $2\frac{1}{4}$  miles wide, but is nearly filled by a bank with depths generally of  $3\frac{1}{2}$  to  $4\frac{1}{2}$  fathoms, having one patch of only  $2\frac{3}{4}$  fathoms, and two patches of 3 fathoms upon it. The  $2\frac{3}{4}$  fathoms patch lies about two-thirds of a mile N.E.  $\frac{3}{4}$  E. from the easternmost of the islets; one of the 3 fathoms patches lies nearly a mile N.E. by E. from the same islet, and the other is about half a mile S. by W.  $\frac{3}{4}$  W. from the western part of Haon Bai Kan.\* The passage between the northern point of the bay and Haon Bai Kan is the best for large vessels, being two-thirds of a mile wide, with depths of 10 to 19 fathoms.

The northern sides of the islets off the southern point of the bay are fringed with coral, as is the western side of Haon Bai Kan; but Haon Lap islet appears to be bold close-to. The bay, inside a line connecting its northern and southern points—which bear from each other N.E.  $\frac{3}{4}$  N. and S.W.  $\frac{3}{4}$  S.—is encumbered with an extensive shore flat, as also many detached shoal patches having less than 6 feet water over them. On account of these dangers vessels should not go inside the line connecting the points, excepting at the south-west part of the bay, where they may stand in until the north point of Haon Bai Kan bears N.E. by E.  $\frac{1}{4}$  E., there being nothing outside that line more dangerous than a patch of  $3\frac{1}{2}$  fathoms, with  $4\frac{1}{2}$  and 5 fathoms near it, which lies nearly half a mile N. by E.  $\frac{1}{2}$  E. from the southern point of the bay; and a small patch of  $3\frac{3}{4}$  fathoms, with 6 and 7 fathoms around it, which lies N.N.E.  $\frac{1}{2}$  E., distant  $1\frac{1}{4}$  miles from the same point.

**Buoy.**—A black buoy surmounted by a ball, is moored in  $6\frac{1}{2}$  feet water, on the southern edge of a 5-feet patch; this buoy should be passed on its south side.

**Anchorage.**—The anchorage in Great bay is only available during the south-west monsoon. In order to avoid the sea, vessels should anchor in its south-west part, where, however, the squalls are heavier, but the holding ground is good, the bottom being gray mud. There appears to be good anchorage, with depths of  $5\frac{1}{2}$  and 6 fathoms, inside the  $3\frac{1}{2}$  and  $3\frac{3}{4}$  fathoms patches, with the south point bearing from S. by W. to South, and Haon Lap islet from E.  $\frac{1}{2}$  N. to E.  $\frac{1}{2}$  S. A good berth for a large vessel appears to be in 7 or 8 fathoms, with Haon Tai-leung, the largest

\* Great bay not having been thoroughly examined, it is possible that other shoal patches than those mentioned may exist.

islet off the south point of the bay, bearing about South, and Haon Lap East or E.  $\frac{1}{2}$  N.

**North-east Bay** is northward of the north point of Great bay, and would appear to offer convenient shelter in the south-west monsoon for vessels not wishing to enter Great bay. It appears to be quite free from danger, but the depths decrease rather quickly from 6 to 5 fathoms. Vessels should therefore anchor in 7 fathoms, or directly the water shoals under that depth.

**Haon Cao**, is the name of a bold island, nearly a mile in extent, lying 2 miles N.E. by E. from Haon Bai Kan. In the channel between them are depths generally from 12 to 15 fathoms, but near Haon Cao the soundings appear to be more irregular, 17 to 29 fathoms.

**White rock** lies N.E. by E.  $\frac{1}{4}$  E.  $3\frac{1}{4}$  miles from the north-east point of the largest island of the Pulo Condore group; around it are 17 to 22 fathoms.

**South-west Bay**, or Pulo Condore harbour, named by the Cochinese Queou Dam Leun, is formed between the south-west end of the large island and the adjoining high island Little Condore, or Bae Vioung, the east point of which is separated from the south-west point of the large island by a narrow channel. The entrance to the bay is about three quarters of a mile wide, with depths of 9 and 7 fathoms, gravel and mud, decreasing to 5 and 3 fathoms near the flat that occupies the head of the harbour, and which is dry at low water. This bay is well sheltered by the surrounding hills, except from the north-westward, but the wind is seldom strong from that quarter; the heavy squalls, however, require precaution, but the holding ground is good.

Some islets lie off the north point of this bay, northward of which is a high island named Haon Trap, having some rocks above and below water extending from its north-west side.

Haon Tae, another high island, lies about a mile to the north-westward of Haon Trap; off its north-eastern extreme is an islet. Haon Tae Niao is another island lying a little more than 2 miles to the north-eastward of Haon Tae, having a reef and some rocks extending a little over a cable from its north and east sides. There is a safe passage inside the two last-mentioned islands, with depths of 16 to 22 fathoms.

**Supplies.**—At the time of the *Riflemen's* visit in 1862, the inhabitants were living in a state of great poverty in miserable huts, and subsisting upon yams, pumpkins, fruit, and fish. Horsburgh remarks:—“These islands abound with timber, but there are no articles of trade to be procured: the soil being generally dry and unfruitful, the country unhealthy, and abounding with reptiles, there is no inducement for strangers to visit this place; consequently, few vessels touch here.”

In the *Mer de Chine*, 1st part, page 197, published in 1865, it is stated that "the character of the inhabitants is very mild. The country, without being rich, yields plenty of fruit, timber for building, and vegetables. The natives rear a large quantity of pigs and poultry."

Water may be procured in the north east part of South-west bay, a short distance to the southward of the landing place.

**Tides.**—It is high water, full and change, at Pulo Condore, at 2h. 30m.; springs rise  $6\frac{1}{2}$  feet.

**Soundings.**—The sounding 13 or 14 miles outside the Brothers, are 17 or 18 fathoms; 13 and 12 fathoms within 2 miles of them on the east and north-east sides, deepening to 17, 18, and 20 fathoms close to Pulo Condore. When Pulo Condore bears North or N. by E., distant about 30 miles, the soundings are 19 and 18 fathoms; when N.W. about 25 miles, 18 and 17 fathoms; West 45 or 50 miles, 24 fathoms; West 60 miles, 27 fathoms. Rounding Pulo Condore on the south and south-east sides within 2 to 3 miles distance, the depths will be 17 or 18 fathoms.

From 18 fathoms, near White rock off the north-east end of the Pulo Condore group, the soundings continue between 18 and 17 fathoms for a few miles in a direct line to cape St. James, when they gradually decrease to 15, 14, and 13, with an occasional depth of 17 fathoms, as that headland is approached.

From Pulo Condore, steering direct for the Great Catwick, the depths increase very slowly until within 50 or 45 miles of the latter, then rather quicker from 30 or 34 to 45 and 50 fathoms near the Catwick.

**ROYAL BISHOP BANK**, in lat.  $9^{\circ} 40' N.$ , long.  $108^{\circ} 14' E.$ , is composed of coral  $3\frac{1}{2}$  miles long, E.N.E and W.S.W., and about  $1\frac{1}{2}$  miles broad, with 10 fathoms water and 28 to 30 fathoms round it.

Circumstances did not permit of a farther search for the 7 and 8 fathoms patches said to be found on the Royal Bishop, and which will probably be discovered to the northward of that bank.\*

**PULO SAPATU**,† or Shoe island, 347 feet high, in lat.  $9^{\circ} 58' 23'' N.$ , long.  $109^{\circ} 5' 57'' E.$ , is the easternmost of three islands named Catwicks. Pulo Sapatu is a barren rock, one-third of a mile long north and south, about half a mile broad, and visible in clear weather at 22 or 23 miles. This island is frequented by numerous birds; and under favourable circumstances landing may be effected upon the rocks at its base; otherwise it is inaccessible. When viewed in some directions, it

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\* Nautical Magazine, 1844, p. 640.

† The name of this island is usually spelt Sapata, but Sapatu is the correct spelling, and is the Malay word for a shoe, the shape of which the island much resembles.

resembles a shoe; at others it seems a large square column; and when bearing to the westward it assumes the form of a pyramid. Vessels generally endeavour to sight this island, or to pass within 20 or 25 miles of its eastern side, in proceeding up or down the Main route of the China sea. With the exception of a rock awash lying a quarter of a cable eastward of its south end, the island is bold close-to: 16 and 17 fathoms were obtained about 2 cables eastward of it, and half a mile off in that direction 25 to 30 fathoms. On the west side the soundings are deeper.

**Julia shoal**, with 15 feet water, situated S.E. by E.,  $3\frac{1}{2}$  miles from Pulo Sapatu, is composed of coral formation, and about a quarter of a mile in extent.

The Little Catwick in line with the northern extreme of Pulo Sapatu, bearing N.W. by W.  $\frac{3}{4}$  W., leads nearly half a mile north-eastward of the Julia; the Little Catwick in line with the southern extreme of Sapatu, leads over 10 fathoms water on the south-west edge of the shoal; and the Little Catwick well open of the southern extreme, N.W.  $\frac{3}{4}$  W., leads half a mile south-westward of it.

When the Little Catwick is just shut in behind the southern extreme of Sapatu, and the angle of elevation of that island is  $1^{\circ} 22'$ , or more, (the height of the eye being 15 feet,) vessels will be one mile or more inside the Julia. When the angle of elevation is  $0^{\circ} 45'$ , or less, (the height of the eye being 15 feet,) they will be one mile or more outside the shoal.

It is strange that no mention of this important danger is made in Horsburgh. In 1836 Mr. Thomas, commanding the ship *Good Success*, observing a rippling, sent a boat to examine it, and found a sharp pinnacle rock, to which the boat was held by a boat hook. In 1847 it was examined in the ship *Julia*, but no less water than 3 fathoms could be found, which is no doubt the usual depth upon the shoal, although it is not safe to depend upon finding more than  $2\frac{1}{2}$  fathoms.

From the examination made in the *Julia* the danger obtained a position on the charts, which position was very nearly the same as that ascribed to it by Mr. Thomas. Navigating Lieutenant Reed agrees with both in bearing, but makes the distance from Pulo Sapatu (which with them must have been a matter of judgment only) a mile less than they.

This shoal has been the cause of more anxiety, perhaps, than any other in the China sea. In all probability many of the reported positions of dangers in that locality have proceeded from this shoal having been seen and its position wrongly estimated.

**The Pyramid, or Little Catwick**, is a small peaked rock 56 feet high, lying N.W. by W.  $\frac{1}{2}$  W.  $2\frac{1}{4}$  miles from Pulo Sapatu. It is steep close to, with no danger near it, and can be seen about 9 to 10 miles.

The channel between this rock and Pulo Sapatu is free from danger,

with soundings of 50 to 65 fathoms. The following observations from Horsburgh are very valuable:—"Although this passage seems to be safe with a commanding wind, it ought not to be adopted excepting in a case of emergency, for it is contracted, and the currents are strong and irregular about these islands. Vessels passing here in the night, during the north-east monsoon, ought to make proper allowance for a south-westerly current, which is liable to deceive, and to carry them down upon the islands, particularly if the wind be strong at the time."

**Round island, or Great Catwick**, is a barren rock 196 feet high, and about 300 yards in diameter, bearing W.N.W., distant  $11\frac{3}{4}$  miles from Sapatu, and nearly South, about 30 miles from Pulo Ceicer de Mer. It is bold close to, having 30 to 50 fathoms at a short distance from it in all directions.

**La Paix rock** is small, with a pinnacle awash, lying nearly in the fairway of the channel between Great and Little Catwick, and [which may, with this exception, be considered safe to navigate. From the pinnacle Great Catwick bears West-northerly, distant  $4\frac{1}{4}$  miles, and Little Catwick is seen open to the southward of Pulo Sapatu, bearing S.E. by E.-easterly,  $5\frac{1}{2}$  miles. Except in fine weather, the sea always breaks upon this rock, and a vessel should not attempt the channel at night, unless the position is accurately known, and other circumstances are favourable.

**Yusun shoal**, in lat.  $10^{\circ} 16' N.$ , long.  $109^{\circ} 2' 15'' E.$ , is a small coral patch of 4 fathoms, lying in the fairway of the channel between Pulo Ceicer de Mer and the Catwicks. From it the south-west summit of the former bears N. by W.  $\frac{3}{4}$  W.  $17\frac{3}{4}$  miles, the Great Catwick S.S.W.  $\frac{1}{4}$  W.  $14\frac{3}{4}$  miles, and Sapatu S. by E.  $\frac{1}{4}$  E. 18 miles; close around it are 45 and 50 fathoms, which is the general depth of the middle of the channel; but about a mile W.N.W. of the shoal is a patch of 24 fathoms.

In fine weather the shoal is not easily seen, but when blowing hard in the strength of the monsoons, the sea has been frequently observed to break heavily upon it.

There is good reason to believe that the Yusun is the only danger in the channel between Ceicer de Mer and the Catwicks, which is otherwise spacious and safe. The soundings in the channel are irregular, and will be better understood by a reference to the chart which these observations are intended to accompany, than by a description here.

**PULO CEICER DE MER** is  $3\frac{1}{2}$  miles long north and south, and  $1\frac{1}{2}$  miles broad. There are two small hills towards its north end, bearing E.N.E. and W.S.W. distant a mile from each other. The south-west and higher hill 360 feet high, in lat.  $10^{\circ} 32' 36'' N.$ , long.  $108^{\circ} 56' 30'' E.$ , has a round top, slopes gradually until it joins the low land, and is visible

at 24 or 25 miles. The north-east hill, 306 feet high, is conical, rises abruptly from the low land, and has several irregular masses of rock near its summit, which give it a somewhat remarkable appearance.

Nearly half a mile off the north-east end of the island are several masses of rocks with foul ground around them; the most conspicuous is a large black rock 60 feet high. This part of the island should not be approached by vessels of large draught nearer than  $1\frac{1}{2}$  or 2 miles, nor by small vessels nearer than a mile. In case of emergency it is possible, perhaps, to obtain shelter from the south-west monsoon by anchoring off the north-east end in 14 or 15 fathoms; but the bottom is rocky, bad holding ground, and by no means to be recommended as an anchorage.

On the east side of the island is a sandy bay which has the appearance of affording convenient anchorage; but a coral reef not only fills it completely, but projects in such a manner that the 5 fathoms line of soundings forms an arc of a circle convex to seaward more than a mile distant from the depth of the bay, and approaches within a cable or two of the north-east and south-east points of the island. Great caution is therefore necessary in approaching this bay, as the soundings decrease so suddenly from no bottom with 40 or 50 fathoms to 4 or 5 fathoms, that the lead cannot be relied upon to give warning of the danger in sufficient time to avoid it.

At half a mile off the south-east end of Ceicer de Mer is a smaller island lying in a north and south direction, the highest point of which is 133 feet above the sea. The south-east part of Ceicer de Mer is nearly the same height, and both present steep rugged cliffs to the eastward. In the middle of the channel between these islands is a mass of rocks just above water, between which and the small island is a channel for boats. A quarter of a mile S.E. of the small island is a conspicuous black rock about 30 feet high, with smaller rocks around it; 2 cables S.E. of which are two rocks awash. The small island, therefore, should not be approached within a mile when bearing to the westward of North.

**Anchorage.**—A sandy beach extends along the whole of the west and south-west coasts of Pulo Ceicer de Mer, the south-west point being formed by a number of black rocks. There is fair anchorage in 13 to 16 fathoms, sand and shells, all along these shores; but the best is just to the southward of the south-west point, where vessels may conveniently anchor in 10 to 14 fathoms. It is necessary, however, to be careful in coming to, as shoal water and rocks extend about a third of a mile from the island, and the depths rapidly decrease from 11 to 4 fathoms.

**Supplies, &c.**—Pulo Ceicer de Mer is inhabited by poor fishermen and others, and is well cultivated, but no supplies could be obtained. The

natives brought off a few fowls upon one occasion, and seemed pleased to receive some empty bottles, biscuit, &c., in return; but they refused all offers of money, and would not be prevailed upon to sell anything. They were much disturbed at the *Rifleman* remaining so long in their neighbourhood, and kept up an almost incessant noise with drums and gongs during the visit. They always lined the beach, armed with spears and other Chinese weapons, when any boat landed, but did not attempt to molest the crew.

**High rock**, of a white colour, 50 feet high, and the resort of sea birds, lies N.W.  $\frac{1}{2}$  N. nearly 5 miles from the north-west point of Ceicer de Mer. Nearly half a cable northward of it is a small rock a few feet above water; close to the northward of which is a rock awash.

In the channel between Ceicer de Mer and High rock the depths vary from 8 to 12 fathoms, coral. Near the rock some patches of 5 and 6 fathoms were found, but no danger discovered. The channel between Ceicer de Mer and Holland bank is about 12 miles wide. The depths in it are irregular, varying from 26 to 10 fathoms, the bottom generally sand, or sand and shells, at the deep soundings, and rocky at the shoal ones.

**HOLLAND BANK** is composed of coral and has various depths of water upon it. Its greatest length (under a depth of 10 fathoms) is  $6\frac{1}{2}$  miles E.N.E. and W.S.W., and its breadth 4 miles. The shoalest patches are towards its north-east end. The soundings on these patches are very irregular; the least water found was  $2\frac{1}{2}$  fathoms. From the centre patch, in lat.  $10^{\circ} 39' N.$ , long.  $108^{\circ} 43' E.$ , the south-west summit of Ceicer de Mer bore about E.S.E. 15 miles, and High rock about E. by S.  $10\frac{1}{2}$  miles.

The south-west hill of Ceicer de Mer bearing S.E. by E.  $\frac{1}{4}$  E. leads just outside the depth of 10 fathoms, on the north-east end of Holland bank; and bearing E. by S.  $\frac{1}{4}$  S., leads outside the same depth on the south end. Therefore, vessels passing northward of the bank, should not bring the south-west or high and sloping hill of Ceicer de Mer eastward of S.E.; and those passing southward of the bank should not bring the same hill to the southward of East.

The soundings round the bank are very irregular, and afford no certain guide, but the bank is much steeper on its eastern edge than elsewhere. The lead, however, is not to be relied on in approaching that edge, for 20 fathoms may be obtained one cast, and 4 fathoms the next. Excepting at the eastern part, if the lead be attended to and hove quickly, it will point out the edge of the bank before a vessel gets into danger.

The following valuable remarks, from Horsburgh, cannot be improved upon:—"To avoid this bank on its western side, do not raise Pulo Ceicer de Mer more than to have the summits of the two hills visible from the poop of a large ship when the island is bearing between E.  $\frac{1}{4}$  S. and S.E.; for if the low part of the island between the hills be *in sight from the*

*poop*, bearing from E. by S. to E.S.E., the vessel will be near the edge of the bank."

**Caution.**—A good look-out should be kept when passing between Ceicer de Mer and High rock, or High rock and Holland bank; for although numerous soundings were obtained by the *Riflesman* in the neighbourhood, and the result of the survey affords reasonable assurance that these channels are safe, yet with depths so irregular and the bottom mostly of coral, the possibility of some small patch having escaped the lead, even in the most careful survey, should always be borne in mind and guarded against as far as possible.

**The Minerva bank**, with 28 fathoms water, the position of which is doubtful, is said to lie in lat.  $10^{\circ} 38' N.$ , long.  $110^{\circ} 18' E.$

Soundings were tried for in the *Riflesman* on the supposed position of this bank, but no bottom was obtained with 200 fathoms; but as a thorough examination was not made, it may, however, exist somewhere near its assigned position.

## PARACEL ISLANDS AND REEFS.

**PARACEL ISLANDS and REEFS** are an extensive group of low islands, reefs, and shoals, which extend from lat.  $15^{\circ} 45\frac{1}{2}'$  to  $17^{\circ} 8' N.$ , and from long.  $111^{\circ} 9'$  to  $112^{\circ} 43' E.$  Vessels should carefully avoid coming within their limits, as the dangers amongst them are not accurately known. This will be seen by the following description by Horsburgh, taken from the survey made by Captains Ross and Maughan, of the Bombay Marine, in 1808.\*

**Triton Island**, in lat.  $15^{\circ} 46' N.$ , long.  $111^{\circ} 11' E.$ , extends in a N.W. and S.E. direction about 3 or 4 miles (according to a plan of it by Captain Brown, of the *Triton*), and is thought to be the most southern and western danger of the Paracels.† Its north part is a sandy lump, about 20 feet high, sloping down in a low point to the south-east, with high breakers projecting a great way in that direction; another reef projects from its north-west end; there is no bottom at 90 fathoms near it.

**Bombay Shoal**, lying between lat.  $15^{\circ} 59'$  and  $16^{\circ} 6' N.$ , and long.  $112^{\circ} 26'$  and  $112^{\circ} 38' E.$ , is a reef of breakers of oblong form, about

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\* See Admiralty charts :—China sea, northern portion, No. 2,661a; and Amphitrite and Paracel islands, Nos. 94 and 95; scales,  $m = 0.7$  of an inch.

† In June 1815, Captain Maughan in the *Investigator*, passed within a quarter of a mile of apparently some patches of coral, having, he supposed, about 6 or 8 fathoms water over them; but no soundings could be obtained with 110 fathoms of line at that distance, and a boat could not be hoisted out to examine them, on account of the high sea and blowing weather. These patches, seen at 2 p.m., are in lat.  $14^{\circ} 12' N.$ , long.  $112^{\circ} 52' E.$ ; but it is uncertain that they were real dangers.



12 miles in extent E. by N. and W. by S., having apparently an entrance at the western part, with deep water inside; some of the rocks are level with the water, and have sandy patches inside of them. This shoal is steep-to, for at three-quarters of a mile off its south side, the *Bombay* had no bottom with 100 fathoms of line; and close around it Captain Ross in his survey could get no bottom. It seems to bear about S. by W. from Pyramid rock, for although the *Bombay* made it several miles more easterly than the longitude stated above from the survey of Captain Ross, it probably is not so; because the *Jehangire* observed at noon in lat.  $16^{\circ} 5' N.$ , long  $112^{\circ} 52' E.$ , and no danger could be discerned from the masthead.

**Jehangire Bank** is named after the above ship, which got upon a coral bank in lat.  $16^{\circ} 18' N.$ , long.  $112^{\circ} 35' E.$ , and had 12 to 10, and  $9\frac{1}{2}$  fathoms water; the next cast was 30 fathoms, and in less than an hour had no bottom, drifting to the south-eastward by the lead, being calm at the time. This seems to agree with the account of Captain Ross's pilot, who stated that there are soundings on coral banks in a narrow line between Lincoln island and the Bombay shoal, which, with those dangers, form the eastern boundary of the Paracels.

**Lincoln Island**,\* the south-east point of which is in lat.  $16^{\circ} 39' 34'' N.$ , long.  $112^{\circ} 44' 23'' E.$ , is  $1\frac{1}{4}$  miles long, N.W. and S.E., three-quarters of a mile wide, and about 20 feet high; it is covered with brushwood, and surrounded by a coral reef, dry at low water, which extends  $1\frac{1}{4}$  miles from its south-east point, half a mile from its north and east sides, and about a cable from its south-west side. A narrow coral shoal projects southward from its north-east point, which is said by Horsburgh to extend 11 miles; time did not admit of its being thoroughly examined by the *Rifleman*, but judging from the soundings that were obtained, the dangerous part of this shoal does not appear to extend farther than 3 miles from the island. Good anchorage can be obtained in the north-east monsoon under its lee in 8 to 10 fathoms, coral, about half a mile from the shore. The spring of excellent water in the centre of this island, mentioned by Horsburgh, is merely a well dug by the Hainan fishermen close to a stunted cocoa-nut tree, into which the salt water filters.

**Pyramid Rock** bears S.W.  $\frac{1}{4}$  W., distant  $7\frac{1}{2}$  miles from the south-east point of Lincoln island; the position of the rock with reference to Lincoln island was ascertained, but no soundings were tried for around it. The coral bank round Lincoln will, in all probability, be found to extend as far as the Pyramid.

H.M.S. *Dido*, in 1844, observed a shoal about 10 miles to the eastward

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\* The description of Lincoln, Duncan, and Drummond islands, and Pyramid rock, is by Navigating Lieutenant Tizard, H.M.S. *Rifleman*, 1865.

of Lincoln island. It is shown on the chart as a doubtful danger in lat.  $16^{\circ} 45' N.$ , long.  $112^{\circ} 54' E.$

**Passoo Keah**, in lat.  $16^{\circ} 6' N.$ , long.  $111^{\circ} 46' E.$ , is a small sandy island, surrounded by a coral reef, having deep water close to.

**Discovery Shoal**.—The west end of this dangerous shoal is in lat.  $16^{\circ} 11' 40'' N.$ , long.  $111^{\circ} 33' E.$ ; thence it extends E.N.E. 15 or 16 miles to its eastern extremity in lat.  $16^{\circ} 16' N.$ , long.,  $111^{\circ} 48\frac{1}{2}' E.$  The reef is of the shape of an extended oval, with an opening one cable wide on its south side, having in it overfalls from 2 to 20 fathoms, and a small opening on the north side. There are no soundings about 20 yards from the reef, and scarcely 2 fathoms water over any part of it, with many spiral rocks a few feet above the water's edge. The Hainan boats come here to fish from January to May.

**Vuladdore Shoal**, lying 9 or 10 miles E. by N. from the Discovery shoal, is 7 miles in extent E.N.E. and W.S.W. It has a few small spiral rocks on it above water, with high breakers, and no soundings at the distance of a cable on either side. Captain Ross made the centre of this shoal in lat.  $16^{\circ} 18' N.$ , long.  $112^{\circ} 2' E.$ ; the Portuguese snow *Vuladdore*, in her passage from Macao to Manila, saw it in lat.  $16^{\circ} 19' N.$ , long.  $112^{\circ} 5' E.$ , bearing S.  $15^{\circ} W.$  39 miles from the Amphitrite islands. She had passed to the westward of these islands on the preceding day, and in steering southward had no soundings, nor did she see any other shoal but that which has been named after her.

**The CRESCENT CHAIN** of islands and reefs, named by Captain Ross, Money, Robert, Pattle, Drummond, and Duncan islands, extends from lat.  $16^{\circ} 27'$  to  $16^{\circ} 37' N.$ , and from long.  $111^{\circ} 28'$  to  $111^{\circ} 46' E.$  They consist of six low sandy islands, for the most part connected by reefs, stretching nearly east and west in the form of a crescent, at the east end of which an elbow is formed by part of the reef trending to the south-westward; on this part stand the two Duncan islands, with an opening 4 miles wide between their contiguous reef and the Antelope shoal, which lies about 2 miles to the eastward of Money, the western island of the group. This opening is on the south side of the chain, and inside there are soundings; but the ground is chiefly coral, with great overfalls from 25 to 5 fathoms. The best anchorage is close to the reef, on the north side of Duncan islands, where there are some broad patches of sandy bottom.

The two Duncan islands are now joined by a sandy spit which is always uncovered; they extend a mile in an east and west direction, are nearly half a mile in breadth and surrounded by a coral reef which extends in some places 4 cables from the shore, and dries at low water. On the westernmost of the islands is a cocoa-nut tree.

Drummond island is nearly round, its diameter being about 600 yards; at 2 cables south of it is a rock above water. A reef of coral projects a short distance from the west side of the island, but extends several miles to the eastward and north-eastward of it. Both Duncan and Drummond islands are covered with brushwood. Between them is a safe channel, upwards of a mile in width, with from 19 to 20 fathoms water. Horsburgh says this channel should not be taken in large vessels, the passage westward of Duncan island being preferable; but the *Rifleman*, when passing between Duncan and Money islands, suddenly got to shoal water, which appeared to extend across that channel, and therefore the channel between Duncan and Drummond islands is certainly safer for steam vessels. Vessels may anchor to the northward of Duncan island in from 16 to 18 fathoms, about half a mile off shore.

Observation bank, in lat.  $16^{\circ} 36' N.$ , long.  $111^{\circ} 40\frac{1}{2}' E.$ , is small, lies on the north side of the Crescent Chain, and may be considered as part of it. Within this bank, about 3 miles to the southward, is an anchorage from 5 to 20 fathoms, on a coral bottom.

**Hotspur Shoal**, on which an American ship of this name was wrecked in 1860, is said to lie in lat.  $16^{\circ} 51' N.$ , long.  $111^{\circ} 30' E.$ ; it is likely, however, to be the North shoal, lying to the northward.

**AMPHITRITE ISLANDS** are in two groups, lying N.N.W. and S.S.E. of each other, and having a deep-water channel between them. The northern group consists of four low narrow islands, connected by a reef of rocks that projects 2 or 3 miles beyond their extremes; upon the westernmost island there is a cocoa-nut tree, from which it has received the name of Tree island. The western extremity of the reef surrounding these islands is in lat.  $16^{\circ} 59' N.$ , long.  $112^{\circ} 12' E.$ ; the reef extends about 10 miles E.S.E., the eastern extremity being in lat.  $16^{\circ} 54' N.$ , long.  $112^{\circ} 22' E.$ , and it forms the northern limit of danger in this part of the archipelago. There are no soundings on the north side, but there is good anchorage in 10 fathoms, sand, under the south-east side of the chain, about half a mile from the rocks; no fresh water is procurable.

The southern group consists of two islands, named Woody and Rocky, lying very near each other. Woody island, in lat.  $16^{\circ} 50\frac{1}{2}' N.$ , long.  $112^{\circ} 19' E.$ , is about 3 miles in circumference, covered with small trees.\* A reef projects around this island to the distance of three-quarters of a mile, connected with Rocky island.

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\* The spring of good water on its western side, near some cocoa-nut trees, mentioned by Horsburgh, is merely a small well dug by the fishermen, the same as that on Lincoln island. The *Rifleman* carried soundings of 25 to 30 fathoms, coral, for some miles westward of the Amphitrite islands.

Rocky island, in lat.  $16^{\circ} 52' N.$ , long.  $112^{\circ} 19\frac{1}{2}' E.$ , is small, and nearly of the same height as Woody island; there are no soundings to the north-east or eastward of it, but irregular soundings extend 6 miles to the south-west of these islands, decreasing to 14 fathoms in some places. Close to the reef on the west side of Woody island there are 25 fathoms; and the depths decrease gradually from 30 to 15 fathoms towards the Amphitrite islands, where a vessel may anchor if requisite.

**North Shoal**, extending E.N.E. and W.S.W. about 6 miles, is narrow and steep-to, having soundings only on the north side, 14 fathoms within half a cable of the rocks. The east end of this shoal or reef is in lat.  $17^{\circ} 6\frac{1}{2}' N.$ , long.  $111^{\circ} 32\frac{1}{2}' E.$ , and it appears to be the north-western danger of the Paracels.

**Tides and Currents.**—At the Crescent chain, and at some other of the Paracel reefs, there are regular tides during springs. The currents run generally strong before the wind in both monsoons, but in light winds between the monsoons they are continually changing their direction amongst the shoals. Vessels should, therefore, never come within the limits of these dangers, if it can possibly be prevented, for they may be drifted upon some of the reefs during calms, close to which there is no anchorage. There are several channels between the different reefs or shoals, from 12 or 15 to 30 and 35 miles wide.

**MACCLESFIELD BANK**, discovered by the English ship of this name in 1701, is of greater extent than is generally supposed, for the *Fort St. David* country ship is said to have obtained soundings in lat.  $15^{\circ} 17' N.$  on its southern part; the *Stormont* had 41 fathoms on its northern part, in lat.  $16^{\circ} 19' N.$  by noon observation, and about one mile farther to the southward she had 14 fathoms water; the *Cirencester* also had  $9\frac{3}{4}$  fathoms, in lat.  $16^{\circ} 19' N.$ , long.  $114^{\circ} 33' E.$ , deepening gradually until in lat.  $16^{\circ} 21\frac{1}{2}' N.$ , then 55 fathoms, no bottom. The bank, therefore, appears to extend from lat.  $15^{\circ} 17'$  to  $16^{\circ} 21' N.$ ; its length East and West being about 70 miles, the western edge being nearly in long.  $113^{\circ} 43' E.$ , and the eastern edge in about long.  $114^{\circ} 53' E.$

The depths on this bank are generally very irregular, from 25 or 30 to 40 or 50 fathoms, coral rock; and in some places, where the soundings are a little regular, the bottom is coarse or fine sand. There appear to be gaps in some parts of the bank, where no soundings have been obtained with 80 or 100 fathoms of line: for several vessels, in steering directly over it, after having obtained soundings, have had no bottom for a considerable time, and obtained soundings again.

On the northern and eastern parts of the bank there are level patches

of considerable dimensions, with regular soundings from 9 to 15 fathoms, sandy bottom; there are also some patches on the southern and western parts, with 14 to 17 fathoms upon them.

The greatest extent of the bank, East and West, appears to be near its northern extremity, for soundings have been obtained in long.  $114^{\circ} 51'$  E. In lat.  $15^{\circ} 56'$  N., and long.  $114^{\circ} 51'$  E., the *Thetis* had  $11\frac{1}{2}$  fathoms, with soundings 3 or 4 miles farther to the eastward, deepening to 20, 40, 60, and 75, then 80 fathoms, no bottom, when in long.  $114^{\circ} 55'$  E.

The above description is from Horsburgh, but the Admiralty chart shows soundings of 17 and 20 fathoms, in about lat.  $15^{\circ} 58'$  N., long.  $115^{\circ} 6'$  E., and 130 fathoms in long.  $115^{\circ} 10'$ , which is 17 miles eastward of Horsburgh's extreme eastern position. The chart also shows  $5\frac{1}{2}$  and 6 fathoms between the parallels of  $16^{\circ} 4'$  and  $16^{\circ} 12'$  N. in about long.  $113^{\circ} 54'$  E., with 30, 40, and 80 fathoms extending to the northward, the latter depth being in lat.  $16^{\circ} 35'$  N.

In 1857 the Siamese vessel *Bangkok*, Captain Moses,\* when crossing this bank in lat.  $16^{\circ} 2\frac{1}{2}'$  N., long.  $114^{\circ} 2\frac{1}{2}'$  E., got suddenly into  $5\frac{1}{2}$  to 4 fathoms, coral and red sand, and as suddenly deepened to 10, 16, and 20 fathoms; the weather was fine, and the sea smooth, otherwise with a swell he believes it would break.

The *Rifleman*, 1865, in lat.  $16^{\circ} 11'$  N., long.  $114^{\circ} 26'$  E., obtained 115 fathoms, sand and mud; a line of soundings was then carried in a S. by E. direction over the bank, and the least depth of water met with was 12 fathoms, the general depths being from 40 to 50 fathoms; but a patch of 15 fathoms was found near its southern edge in lat.  $15^{\circ} 34'$  N., long.  $114^{\circ} 30'$  E.; and 5 miles further southward no bottom could be obtained with 307 fathoms of line.

In 1867, when in lat.  $16^{\circ} 34'$  N., long.  $114^{\circ} 13'$  E., steered for the 4-fathoms patch, reported to have been passed over in 1857, by Captain Moses, in lat.  $16^{\circ} 2' 30''$  N., long.  $114^{\circ} 2' 30''$  E.; the deep-sea lead was kept constantly going, but no bottom was obtained with 50 to 60 fathoms of line. At noon the vessel was in lat.  $15^{\circ} 59'$  N., long.  $113^{\circ} 58'$  E., having passed about 2 miles westward of the ascribed position of the patch. Proceeding to the southward, soundings of 42 fathoms, coral were obtained on the northern edge of the bank in lat.  $15^{\circ} 51'$  N., long.  $113^{\circ} 57'$  E.; with regular depths of 42 and 43 fathoms until in lat.  $15^{\circ} 30'$  N., long.  $113^{\circ} 57'$  E., where 32 fathoms were obtained; 3 miles south of this position no bottom was reached with 103 fathoms.

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\* Mer. Mag., 1857, p. 252.

In 1868 struck soundings in 40 fathoms on the northern edge of this bank in  $15^{\circ} 31' N.$ , and  $113^{\circ} 40' E.$ ; from this position a line of soundings—40 to 33 fathoms—was carried across the bank in a  $S. \frac{1}{2} E.$  direction for 11 miles, when no bottom with 50, and immediately afterwards, no bottom with 100 fathoms of line could be obtained.

Between the western edge of the Macclesfield bank and the eastern limit of the Paracel reefs, it has been said that there are other coral banks, with soundings of various depths upon them; yet in this space of about 30 miles, probably no soundings are to be obtained.

**St. Esprit Shoal**, of coral formation, is  $2\frac{1}{2}$  miles long, east and west, and  $1\frac{1}{2}$  miles broad; its centre being in lat.  $19^{\circ} 33' N.$ , long.  $113^{\circ} 2' E.$  The general depths on this shoal are 9 fathoms, the least water obtained being 7 fathoms, with 60 to 80 fathoms close to.

**Helen shoal** in lat.  $19^{\circ} 12' N.$ , long.  $113^{\circ} 53' 39'' E.$  is  $1\frac{1}{2}$  miles long, E.N.E. and W.S.W., and a mile broad. The least water upon it is  $6\frac{1}{2}$  fathoms, the general depths being 8 and 9 fathoms; with no bottom at 100 fathoms close around.

**Currents.**—Strong tide rips were observed in the vicinity of St. Esprit and Helen shoals, but on examination deep water was found to exist. The current was found to set generally to leeward.

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CHAPTER V.  
NORTH-WEST COAST OF BORNEO.  
TANJONG API TO BRUNI RIVER.

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VARIATION,  $1^{\circ} 20'$  East, in 1879.

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**TANJONG API** is a low spit forming the north-western extremity of Borneo. The term *Api*, fire, as explained by an intelligent Malay fisherman, a semi-pirate, was applied to this point, owing to its being the principal pirate rendezvous, where the visitors upon going away were accustomed to leave a log burning near the stream for a signal to their friends. A dormant fire was noticed.\*

The point may be distinguished from the northward or southward by its abrupt termination formed by the stems of large trees, differing from mangrove, as well as by a small hummock within. The beach, also, is remarkable, being composed of very white sand, studded with black basaltic rocks, which project to seaward. If approaching from the north-westward the small hummock will not be seen, and the point can only be found by these rocks, the largest, or northernmost, being the safest landing place, in lat  $1^{\circ} 56' 36''$  N., long.  $109^{\circ} 19'$  E.

Approaching from the south-westward the point may be recognised by the rocks outside the sands, which, as the vessel advances northerly, is succeeded in an easterly direction by a sandy beach, on which the sea breaks heavily.

There is an extensive off-lying reef filled in by a sand-bank, which encircles the point, leaving an entrance to the northward. The soundings decrease rapidly from 12, 7, to 2 fathoms. Good anchorage may be found in 14 fathoms W.N.W. of *Api* rock.

The timber which grows about this point is of the kind usually met with on solid ground, and therefore free from filth and unhealthiness of mangrove swamps. Poon, palo-maria, and woods resembling cedar and ebony, adapted for spars and boat planks, were obtained here.

The entire range of *Datu*, seen clear of the intermediate mangroves, will lead to the northward of the dangers near *Api* point.

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\* The general observations on the coasts of Borneo are chiefly by Captain Sir R. Belcher. See Admiralty charts:—Borneo, N.W. coast, sheet 1, No. 2,104; scale,  $m = 0.2$  of an inch; and sheet 2, No. 1,746; scale,  $m = 0.2$  of an inch.

**Water.**—As this is the only spot where good water can be conveniently obtained in this neighbourhood, it will be necessary to attend to the following instructions for landing and procuring it with safety.

The sea forces up the sand on Tanjong Api, and closes the mouth of a small river which would otherwise flow to the sea. It is probably a wise provision of nature that it is not permitted to flow with the accustomed freedom, as the water would probably be soon drained off. The main stream, thus dammed up by the sand, forms a deep dark coloured pool of a reddish tint, resulting from the infusion of dead leaves and decayed vegetable matter which are constantly thrown into it, and would probably deter many from making use of this deeply-tinted water ; but a small pond is formed lying parallel to the beach, and containing about 100 tons of pure water, filtered through the barrier of sand.

The facility for watering is great, unless, indeed, at such times when the surf renders the beach dangerous. But here the point is, in a great measure, protected by an outer bank, distant about a mile, and almost forming a crescent barrier, and by beds of rock immediately in front. Between these rocks there is a safe passage for boats, but due caution is necessary.

The best landing will be found 60 yards to the southward of the great rock on the north, where the beach is clear. It is advisable, where boats are not hauled up, to drop an anchor well out, and veer in, as there are several small but flat rocks which would injure laden boats if too close to the beach, but which will show with the first receding wave.

Immediately within the beach line will be found the pond before alluded to, into which the engine suction hose may be placed, and if guarded by a tub pierced with large holes on its sides about one foot from its bottom, it will protect the engine from being injured by the sand.

This supply is of such importance that persons visiting Tanjong Api should be warned against cutting a channel to the sea, by which it might be destroyed.

**Tides.**—The tide at Tanjong Api was found to rise about 7 feet, the direction of the flood, in 15 fathoms at 2 miles off shore, being E.N.E., and of the ebb S.S.W.

**The Coast.**—From a position off Tanjong Api to a similar position off Tanjong Datu the course is E.N.E., and the distance  $22\frac{1}{2}$  miles. The dangers within the line between these points have not been satisfactorily examined, and there is some reason to apprehend, from the sudden changes in the soundings, attended with suspicious eddies, that undiscovered rocks lie near the surface.

As a general caution, a parallel course of E.N.E. from the depth of 16 fathoms, giving Tanjong Api as well as Tanjong Datu a berth of 3 miles,



should be steered. The depths may vary between 16 and 12 fathoms, and possibly 7 or 6 fathoms, but it is highly probably that this latter depth belongs to an off-lying bank, and that the direct course given above is safe. Although only a few soundings appear on the chart, it is not from any want of examination, but truly from the absence of reliable objects to be seen from the sounding boats, to enable many of those taken to be inserted satisfactorily.



Tanjong Datu. E.N.E.

**TANJONG DATU.**—Great caution should be observed in approaching this point. The tides are rapid, and the reef which encircles it, at a radius of 2 miles, has several rocks which are frequently awash.

H.M.S. *Samarang* was anchored among them, but the soundings were so variable, from 2 to 10 fathoms, with rapid tides, that it was not without infinite labour, and by mooring boats on the separate dangers, that they could be satisfactorily determined. There is no inducement to bring a vessel within 3 miles, therefore no excuse for risking its dangers within a depth of 19 fathoms, where a vessel may securely anchor to await the change of tide.

The entire western coast of this mountainous range is studded with rocks, and the landing is difficult and dangerous. On the eastern side the coast trends suddenly to the southward steep-to, and has two sandy bays. A coral bank, with detached rocks, being a continuation from the point, extends about 3 miles to the southward, but there is deep water within.

**Tides.**—The flood stream off shore sets East, the ebb nearly West; rate 2 to  $2\frac{1}{2}$  knots.

**NIGER BANK**, discovered in 1858 by H.M.S. *Niger*, and surveyed in 1862 by the *Rifleman*, is composed of hard clay,  $4\frac{1}{2}$  miles long east and west, and  $1\frac{1}{2}$  miles broad. The outer edge of the centre part of the bank lies about North, distant 5 miles from Tanjong Datu. The bank has 5 to 9 fathoms on it, and is convenient to anchor upon to await tide; the 5-fathoms spots are towards the east and south-east ends.

**Caution.**—In the event of detached boats, or a very small vessel, seeking shelter, it may be found at 7 miles southward of Tanjong Datu, in Sleepy bay (Pirate bay), but caution is necessary, as there are several

rocks near the surface. Fresh water was not found. The whole space included between a line from Tanjong Datu to Talan island is dangerous, as the whole sweep of that side of the bay to Tanjong Datu contains numerous dangers, which at low water show very distinctly to the southward of Serabang island (Pirate island); and as rocks have been discovered suddenly 4 or 5 miles off Tanjong Sipang and Tanjong Datu on ground tolerably well examined, and where their existence was considered improbable, this caution is particularly necessary within the limit assigned.

**The Coast.**—Tanjong Sipang, at the extremity of a high peninsula, lies E.S.E. 43 miles from Tanjong Datu, the coast between forming an extensive bay, within which are the rivers Siru, Samatan, and Lundu; Sampadien and some minor estuaries also discharge their waters, and in the eastern extreme of this bay the Sarawak presents its western embouchure. There are apparently no dangers in this bay outside the depth of 6 fathoms, but within that depth great caution is necessary.

The annexed woodcut exhibits Tanjong Sipang, and Santubong peak, as seen from off Tanjong Datu.



Pouce S.E. by E.  $\frac{1}{2}$  E. 40 miles.

Santubong Peak (2,712 feet).

**The TALAN or TURTLE ISLANDS** lie S.E. by S. 13 miles from Tanjong Datu, and deserve notice as affording a rendezvous or shelter under their lee for boats. The northern island is remarkable for the resort of turtle to a small sandy beach on its southern side; and is inhabited by a Malay family, who hold it of the Rajah of Sarawak, on account of the eggs. On the early visits live turtle were obtained; but having ascertained that their capture was illegal and injurious to the egg trade, it was eventually prohibited. Water of an indifferent quality, and fish were procured, but merely sufficient for a boat's crew.

**Turtle Rock**, lying S.S.W. about three quarters of a mile from Little Talan island, is uncovered at low water, and dangerous by night. It lies with the eastern side of the north and the western side of the south Talan, in line forming a saddle gap; and it is entirely avoided by keeping their eastern sides open of each other.

**The Siru River**, about 15 miles to the southward of Tanjong Datu, may be entered in a light boat in very fine weather. There are no inhabitants, but fishermen occasionally resort there from Samatan.

**Samatan river**, the entrance to which lies nearly 5 miles E.S.E. of the Siru, will be found by keeping in  $2\frac{1}{2}$  or 3 fathoms whilst to the westward. If it be low water the deepest channel will be found within 20 yards of the breaker line, which runs in steep to the sand on the west. Within is a fishing station with a few huts, but no good water can be obtained.

**Lundu river.**— Between the Samatan and the Lundu, about 7 miles to the south-east, it is probable that many hidden rocks lie unexplored. On the great sandy flat extending off the mouth of the latter river, the Lundu rock was eventually discovered by a very low spring tide.

The best channel will be found on the west, by rounding the rocks of Baugh point, and following the curvature of the banks at a short distance from the trees. This course carried the *Samarang's* boats safely in and out at low water, which is the best time to enter, when the channel is unmistakably marked by the sands left dry. This remark is important, because the native pilot insisted on a direct course, which left two boats dry until the returning tide.

After passing the flats and reaching the first sandy point on the right, the river suddenly bends westerly, and depths of 4 and 6 fathoms will be found by keeping on the concave bends. The town of Tundong stands 9 miles from the mouth, and was guarded by two substantial booms so well jointed below water by rattan lashings that no axe would separate them; saws alone would effect it. The booms were composed of timber barks 20 feet long by 2 feet in diameter; and, being moored 200 feet asunder, formed two necklaces, or sacs, bellying in the direction of the stream which always runs down. On the left of the town, an indifferent wooden stockade, having three embrasures, commanded the entrance, by which boats were admitted under consent. The population was stated to comprise 200 males at the period of the visit (1844).

The water at the village is fresh, purer than that at Sarawak, and was found to be good within 5 miles of the mouth; some of the men drank it even at the river mouth, within a mile of the sea.

Until further examination, no vessel should come within a depth of 5 fathoms, as there is great reason to believe that the ground is foul between the Lundu rock and Sampadien island.

**TANJONG SIPANG** may always be distinguished from the eastward or westward by two remarkable thumbs or sugar-loaf cones which show out clear at its northern extremity. The southern crest of the range (Santubong peak) can be seen clearly at a distance of 40 miles.

**Water.**—On the western cliff side of Sipang, marked by the arrow on the woodcut, may be seen a small drip of excellent water sufficient



Tanjong Sipang watering spot.

for the supply of a boat's crew, running at the rate of 10 gallons in 15 minutes.

**Cruizer Rock** situated 3 miles North of Tanjong Sipangun, covers at half ebb, with 5 to 6 fathoms close to, and is difficult to find. At a quarter of a mile S.W. by W.  $\frac{3}{4}$  W. from Cruizer rock there is a depth of 3 fathoms, with 5 to 6 fathoms close around. Matang peak in line with the western side of Tanjong Sipang, leads east of Cruizer rock, the eastern points of Tanjong Sipang in line leads west of the rock and 3-fathom patch; and the thumb of the point, end on leads on Cruizer rock.

**Currents.**—Sailing vessels navigating this coast must always be prepared to drop a light anchor should calm attend an opposing tide, and particularly between Tanjong Api and Tanjong Sirik. In the depth of 14 fathoms no danger may be apprehended. The flood does not run more than four hours, but the strength of the ebb prevails eight; therefore, where calms are frequent, and steam not available, no advance can be made without great attention to this subject. Off Tanjong Datu, in June, the ebb has been known to run for 15 hours, at an average velocity of  $1\frac{1}{2}$  knots per hour.

**The SANTUBONG ENTRANCE to the SARAWAK RIVER** was surveyed by Sir Edward Belcher in 1844.\*—Report had alluded to this as the safer entrance, but after a most elaborate examination, and taking the *Samarang* in and out, it was evident, from the sandy nature of the bottom, that not only constant fluctuation in the direction of

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\* See Admiralty plans :—Sarawak river, No. 1,822; scale,  $m = 1$  inch; and Santubong entrance; scale,  $m = 1\cdot2$  inches, on chart of Borneo, N.W. coast, sheet 2.

the channel, as well as depth, must be expected, but that any extraordinary freshets, resulting from the torrents of rain which frequently prevail, may eventually silt up or bar it altogether. Watering here is indifferent; wood plentiful; the casuarina, or species of ironwood, is well adapted for fuel; but as it becomes as hard as lignum vitæ when dry, it should at once be cut into convenient lengths.

Mr. H. V. Russell, Master, H.M.S. *Renard*, in 1863 remarks, that the Santubong entrance is not navigable in the north-east monsoon; even the small trading steam vessel uses the Moratabas entrance when going to Singapore during this season, when there is a heavy swell on the Santubong bar. But at any time the Moratabas is the better channel for a stranger to take. Pilots are not to be found at the mouths of the river, but by sending to the Rajah of Sarawak, the assistance of the Europeans in charge of the gun boats may be obtained.

**Fairway Buoy.**—A red buoy lies on the outer edge of the bar, Santubong entrance, but its position cannot be depended on.

**Tides.**—It is high water, full and change, at the Santubong entrance, at 4 h., springs rise 10 feet, neaps 6 feet; at the Sarawak junction at 5 h., at Sarawak city at 5h. 20 m., springs rise 15 to 18 feet, neaps 9 feet; and at the Moratabas entrance at 4h., springs rise 9 feet, neaps 5½ feet.

The high tides occur at night when the sun is south of the equator, and during the day when the sun is north of the equator, equalizing probably at the equinoxes.\*

**Directions.**—Making the land from the north-west or north-east, the position, as regards the two entrances to the Sarawak, may immediately be determined by the inland or coast ranges in connection. Thus, Matang peak seen clear to the westward of Santubong crest can leave no doubt as to the lead to the western mouth. The thumbs will also show on the left of the profile of Sipang. Another feature is exhibited, which is not visible farther to the eastward; this is, the topsail-shaped detached elevation on the right of Matang, as in woodcut.



Matang and Topsail Peak from the Westward.

Approaching from the north-east, Matang seen eastward of Santubong peak, bearing S.W. by W. ½ W., will afford a satisfactory guide either for

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\* Commander C. J. Bullock, H.M.S. *Serpent*, 1866.

Tanjong Sipang, or for finding Po point, the mark for the Moratabas entrance to Sarawak river.

Matang, when seen to the eastward of Santubong, shields Topsail peak from view, and the very steep character of Santubong affords on this view (as in woodcut) a safe leading mark, even as far as the mouth of the Sarebas river.



Matang (3,168 feet) open of Santubong, 25 miles.

In approaching the Santubong entrance, if the weather be fine, with sun, the bright sandy beach behind Kra island, will show very distinctly from 5 miles distance. Southward of Kra are two cones, the north and south Haycocks.\* The north Haycock well open of Kra, leads safe in on a S. by E.  $\frac{3}{4}$  E. course.

But having neared Kra, the beach behind will exhibit a black patch of rocks, which if seen open on either side of Kra island the vessel will be on the limit of danger.

Steer direct for Kra until the river points open, in 4 fathoms, taking care to avoid the Rainbow reef, and Royalist rock, the latter marked by a beacon, lies with Kra bearing S. by E., distant 4 cables, and Cross point N.E.  $\frac{1}{2}$  E. nearly three-quarters of a mile; then alter course quickly for mid-channel, hugging the port shore, and rounding to *port* the instant Cross point is passed, when the anchor should be let go before the vessel is driven, by the sudden increase of velocity, far up the river.

If the weather should prove cloudy, the boundary of the outer dangers may be found by running for the Pouce, on Sipang, with Brooke range open of the south extreme of Satang until the north extremes of Little Satang and Sampadien islands are in line, or overlapping to form a saddle.



Sampadien half open of Little Satang.

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\* These cones appears to be the hills named Gingang.

At this time Alligator point should not shut in Cross point, and the highest peak of the Monkey range, on the south side, should also be open. This is the fair way.

If the flood be running, it will be necessary to calculate on a strong easterly set across the great sand flat, and a course should be steered to keep the Haycock open, or the beach behind Kra, as before recommended.

If the ebb prevail, the stream will be end on, but tend to set the vessel to the westward on the one-fathom bank. It should also be borne in mind that the whole strength of flood becomes concentrated at the funnel gorge of the Santubong entrance. By letting go the anchor, and rounding short to port, as before recommended, the vessel is carried into the least force of the tide, and there is no danger of grounding, the bank being steep-to and the set off shore.\*

Coming from the north, or north-west, bring the high peak of Santubong to bear S.S.E., and steer directly for it until the before-mentioned leading marks can be made out, and with this caution: that if the beach behind Kra, or Monkey peak, be shut in by the western point of Santubong, the vessel must be edged westerly.

Another caution is requisite during flood tide—immediate attention to the change of course on opening the river, to prevent being pressed on the southern shore by the tide.

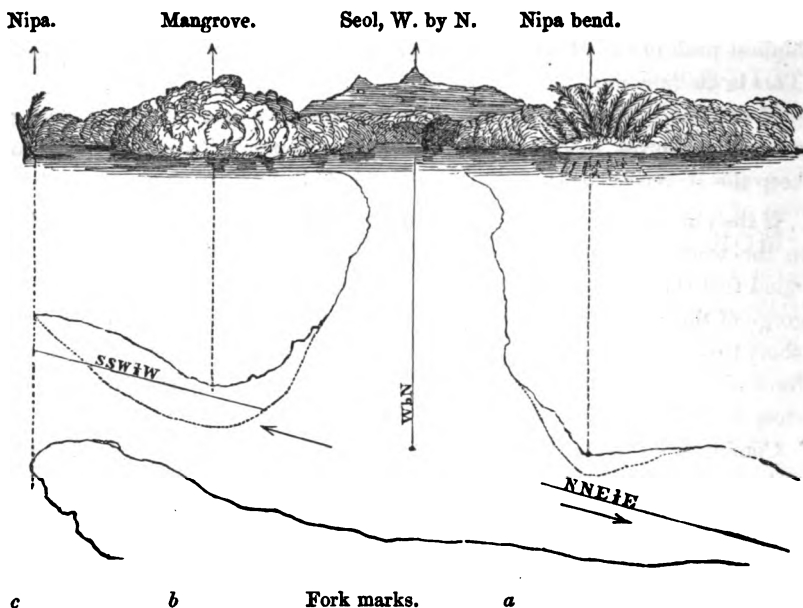
To ascend this branch of the Sarawak it will be expedient to obtain a good local pilot, or to have boats sounding in advance, as well as immediately under the bowsprit, as there are several dangerous patches of rock, one of which is in mid-channel.

To a stranger this branch of the river is peculiarly embarrassing, and he will stand a chance of getting bewildered at the moment of high water on the change of tide, as the current at the fork, where the Moratabas forms the junction, will appear to him to be the continuation of the tide (opposing or favourable) with which he had been previously working, the flood of Santubong running into and following the ebb of the Moratabas. This misled the surveying officers frequently. If the weather should be clear and the mountains visible, the remarkable isolated, conical peak of mount Seol furnishes a safe guide on entering the fork, as will be evident in the accompanying woodcut.

This mountain seen up the long reach on a W. by N. bearing leads to Sarawak, the Santubong reaches to seaward N.N.E.  $\frac{1}{2}$  E., and the lead into the Moratabas S.S.W.  $\frac{1}{2}$  W.

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\* These remarks, by Sir Edward Belcher, apply to the state of the channel in 1844 and for vessels drawing about 12 feet.



There are other indications, also known to those resident at this river, and important to be considered. The bushes on the right bend leading to Sarawak are the nipa palm (*a*). Off this point a clay bank extends. Junction point, (*b*), is covered with tall mangroves, and from it an extensive shoal muddy bank extends into the Moratabas entrance. The left bank (*c*) is also nipa.

It is almost an invariable rule, in the rivers of Borneo, that deep water will be found on the bank where the nipa grows, provided that line be the hollow curve or straight, and there the swiftest tides will be experienced. On the other hand, mud pits, or coral ledges, are generally accompanied by mangrove. This may be explained by the fact that the mangrove sends forth its shoots from the bank into the sea, where, taking root, they stand as it were on piles, admitting freely the ingress and egress of the tides, and favouring the deposit of mud. The nipa palm, on the other hand, generally selects a stiff tenacious clay, and binding the soil together with its matted roots, defies the abrading power of the current, which sweeps away all matter which might otherwise be deposited.

From the fork to the town of Sarawak or Kuching, the course cannot be mistaken, as there are no other branches of streams which can mislead. Directions for this part of the river are given at page 99.

Proceeding to sea from the Santubong, and having reached the clearing mark, Little Satang to the left of Sampadien, a course may be steered



to pass Tanjong Sipang, which may be approached safely to one mile, when the Cruiser rock will be avoided.

**LIGHT.**—On the south-east part of Po point stands a white light-house, from which a fixed white light is exhibited at an elevation of 490 feet above the sea, visible in clear weather from a distance of 20 miles. The light is obscured in the direction of Cruiser rock by the hill north-west of it.

**MORATABAS ENTRANCE to the SARAWAK.**—From Tanjong Sipang, Pulo Laki or Peile, lying off the northern extremity of Po point, bears E. by S.  $\frac{1}{2}$  S.  $10\frac{1}{2}$  miles; and this course may be safely steered by day or night, if the land can be distinguished, hauling northerly if the depth decreases to less than 5 fathoms; but in bad weather or fogs a depth of not less than 12 fathoms should be risked.

The entire face of Moratabas sea range to the north-east is steep-to, and may safely be approached into 5 fathoms; and if intending to enter the Moratabas channel, this shore should be hugged, passing within half a mile of a white rock or islet off Po point. This rock is 6 feet high, composed of sandstone, steep-to, and has depths of 4, 5, and 6 fathoms between it and the bluff of the point. The Moratabas channel begins at this white rock, within half a mile of which is the deep part. If not bound to the Moratabas entrance, the thumbs of Tanjong Sipang should not be brought to the northward of West, until Burong island bears S.E., in order to avoid the outer edge of the eastern bank of the entrance.

Mr. Moss, Master, H.M.S. *Scout*, in March 1863, surveyed the Moratabas entrance, and found that the banks forming the channel had altered considerably since Sir Edward Belcher's survey, rendering the directions for navigating it given by that officer no longer practicable. Mr. Russell, Master, H.M.S. *Renard*, shortly afterwards made a track survey of the river from Moratabas point to Sarawak, which is sufficient to enable vessels to proceed up safely.\* The *Rifleman* frequently entered the river and steamed up to Sarawak, guided by these surveys, finding the soundings correct, and experiencing no difficulty.

The channel of Moratabas entrance is bounded on either side by banks composed generally of sand, with mud in some parts. The western bank trends from Po point about S.  $\frac{3}{4}$  E. for a distance of nearly 3 miles, S.S.W.  $\frac{3}{4}$  W. one mile, and S.W. by W.  $1\frac{1}{2}$  miles, where it forms a slight projection; from thence it trends West to Moratabas point, distant half a mile.

A conical buoy painted red is placed off the spit of the Si Jalore shoal, or western bank, in  $3\frac{1}{2}$  fathoms, low water, spring tides. Vessels should

\* The Admiralty chart of Sarawak river, No. 1,822; scale,  $m = 1$  inch, has been corrected from the surveys of Messrs. Moss and Russell.

not attempt to pass westward of this buoy, but should pass a quarter of a mile eastward of it. The spit of Si Jalore shoal is said to be extending to the eastward.

The outer edge of the eastern bank, marked by the 3 fathoms line, appears to lie about N.E. by N., distant  $3\frac{1}{4}$  miles from Po point ; from thence it takes a southerly direction for 5 miles, and then curves up gradually to Brooke point, opposite Moratabas point. But the outline of the eastern bank is somewhat irregular, and a detached knoll of sand, with only 14 feet water over it, named Scout shoal, from H.M.S. *Scout* having touched upon it, lies with Po point bearing N.W. by N., and Moratabas point S.W. southerly.

The deepest water over the bar is between this knoll and the western bank, the distance between them being about a mile. The depths at low water spring tides are  $3\frac{3}{4}$  and 4 fathoms, and the bottom is composed of hard sand.

**Caution.**—During strong northerly winds a heavy swell is experienced in the Moratabas entrance to Sarawak river, and the passage is not then considered advisable for vessels drawing 18 feet. H.M.S. *Juno*, 17th February 1877, drawing 18 feet, slightly touched at half tide, in mid channel, when about half-way between Po and Moratabas points. At the time, the soundings in the chains were 28 feet, with Moratabas point bearing S.W.  $\frac{1}{2}$  S. southerly ; remarkable hollow in the range of hills between Moratabas and Po points, West ; and 6 feet rock half its breadth open of Po point N. by W.  $\frac{1}{4}$  W.

**Otter Rock.**\*—The barque *Otter*, on her way down from Quop anchorage, struck and remained some hours on a pinnacle rock, with only 3 feet on it at low water springs, and deep water all round.

This rock is said to lie nearly in the middle of the river,  $1\frac{3}{4}$  miles within the entrance points, and E.N.E. about 9 cables from the Belcher rock.†

The pilots and small steam vessels navigating the river always pass to the southward of Otter rock.

**Water.**—Vessels may possibly be induced to seek the Moratabas entrance with the sole intention of obtaining wood and water, where indeed it may be obtained with freedom from disturbance by bad weather or other impediments. But to the active cruizer, not intent on communicating with Sarawak, and anxious merely to replenish his stock of water, here he will find it pure and abundant, and under attention to the following hints, may expeditiously effect his object.

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\* Commander W. Chimmo, H.M. surveying vessel *Nassau*, 1871.

† As to the existence of Otter rock, Lieutenant J. C. Roughton, H.M.S. *Fly*, 1878, states :—"The existence of this rock appears to be doubtful. Captain Kirk informed me that he had searched for it unsuccessfully. The fishermen who live close by know nothing of it. Captain Kirk thinks the *Otter* must have struck on the Belcher rocks."

Bad weather was seldom experienced during the survey by the officers of the *Samarang*, and there was seldom any hesitation in anchoring the vessel very close to the shore. The position to the eastward of Pulo Laki (where water is marked on the chart), will, on close inspection, discover a water-stained cliff, with a minute cascade delivering itself most invitingly into the sea. The ascent to the cliff, about 30 feet above the sea, is easy. On the summit will be found a series of natural reservoirs of transparent water. Small casks were filled and lowered into the boats; but latterly it was found to be more expeditious to screw the engine hose into the bung-hole of a cask or tub, immerse it in one of the reservoirs, and lead the hose over the cliff into the boats. This prevented the disturbance of the pool, and furnished clear water at a rapid rate without having recourse to the engine. (This cannot be accomplished by the slow drain of water at Moratabas.) Boats employed watering at the cascade should be provided with anchor and cable, and veer in, as the swell may otherwise land them on a rock. As the bottom is foul, the anchor should be buoyed by an oar, and a hitch taken over the upper fluke.

**Directions to the Quop Anchorage.**—The tides at the Moratabas entrance have been noticed at page 91. After passing the 6-foot rock northward of Po point at a distance of about half a mile, steer to the southward so as to bring the rock its breadth open of Po point, bearing about N. by W.  $\frac{1}{4}$  W. Keep this mark on until Santubong peak is seen in the centre of a remarkable hollow in the range of hills between Moratabas and Po points, when the vessel will be abreast the red conical buoy marking the spit of the Si Jalore shoal; then steer about S.S.W. for a small clump of trees on the low land left of the Mangrove point opposite Moratabas point, till the river is well open, then keep in mid-channel.\*

In entering this river, to guard against the effects of the tide, frequent bearings of Po and Moratabas points should be taken, which will readily show the vessel's position. Several large fishing stakes being usually moored in mid-channel, vessels should not attempt to enter at night. Having entered the river, and passed Moratabas hill, keep rather nearer to the southern shore than mid-channel, to avoid the Moratabas and Belcher rocks,† which lie on either side of a small creek on the northern shore, about  $2\frac{1}{2}$  miles from Moratabas point. A beacon stands on the southern shore, abreast of Belcher rocks, with the words, "Rocks in mid river," on it. From McDougall point to the Rhiam river there are no

\* Mr. S. M. Spry, Second Master, H.M.S. *Beagle*, 1862, remarks :—There is a village on the left bank of the Moratabas branch, where steam-vessels can be supplied with firewood kept ready cut. Care must be taken in approaching the village as it is fronted by a rocky bed, the water shoaling quickly from 11 to 3 fathoms.

† The Belcher rocks are said to extend further toward mid-river than shown on the chart.—Lieutenant J. C. Roughton, 1878.

landers known to exist, except the small 3-fathoms bank at the entrance of a creek south-westward of McDougall point on the opposite shore, and the shingle bank which extends a short distance from Renard point.

The mouth of the Rhiam river must be avoided, as a spit turns off and continues some way to the westward of it; a mid-channel course will give plenty of water. When Sijinkat hill begins to be hidden by the trees on the south side of the river, that side should be neared a little, in order to avoid a 2-fathoms bank which projects from the opposite side; from thence to the Quop the river is clear.

**Quop Anchorage.**—The best anchorage is with Burney point W.N.W. to N.W., about one-third the breadth of the river from the south shore. The holding ground from this to the junction is bad.

Off the antimony stores, about half a mile inside the Quop river, is a rock with 3 fathoms water over it at low tides; and off the first point inside that river are three rocks which show at low water springs. The natives told Mr. Russell there were three passages through them, but their positions, owing to want of time, could not be determined.

Mr. Russell observes that "this is the only place where a stranger is likely to make a mistake, as owing to the sharpness of the turn leading to the Junction a vessel is liable, unless a good look-out is kept, to be off the mouth of the Quop before the reach is recognized; but it may be remarked that the village at the antimony stores is the first met with after passing Sinjinkat." A road has been made from the antimony stores to Sarawak.

**Rock.**—Near the junction of the Quop with Sarawak river, a rock is said to exist within 20 yards of the left bank of the branch leading to Sarawak.

A mid channel course in rounding Burney point will lead clear of this rock.

**Coals** can be obtained at Sarawak and put on board at Quop anchorage, they are brought down the river in lighters, price 7·80 dollars the ton. These coals are good for raising steam, but burn quickly.\*

**Caution.**—Vessels drawing more than 15 feet water, or of greater length than 200 feet, cannot go above the Quop without incurring considerable risk; and almost every vessel-of-war that has gone up has met with some accident. The greatest caution should be used in navigating and selecting a berth in the upper part of the river, for it is extremely dangerous to get on any of the beds of rocks near high water, with a fall of 14 or 15 feet. No vessel should attempt to lie at single anchor; it is indispensable to moor, and many serious accidents have been occasioned by neglecting this precaution.

**Serail Bank.**—Nearly  $1\frac{1}{2}$  miles northward of Middle point, in the

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\* Commander Basil E. Cochrane, H.M.S. *Lily*, 1876.

Santubong branch of the river, is the Serail river, having at its entrance a bank which dries at low water. The bank is formed of mud, covered a foot deep with hard sand, and is perfectly clear of rocks. It is an excellent place for grounding a vessel to repair damages, for it is very flat, has 12 to 16 feet over it at high water, is 2 or 3 feet above low water springs, and remains dry about 3 hours, its extent at that time being 380 feet long by 180 feet wide; its western edge is steep-to and deepens suddenly into 6 or 8 feet.

Vessels grounding on the bank for repairs, &c., should, in addition to an anchor ahead and astern, secure the stern well to the trees on the eastern side (Ward point), as the last of the flood and the first of the ebb run down from the Sarawak Junction with great strength. The tidal stream is, however, irregular, and at times may be observed running in one direction one side of the river, and in the opposite direction the other side.

Southward of the bank are several knolls, with 8 and 12 feet water over them.

### **Directions from the Quop Anchorage to Sarawak.**

—Having passed Tree point, keep in about mid-channel, avoiding the Mangrove shore on the starboard hand, the deepest water being close to the Nipa bank on the port hand; but a rock with 6 feet water over it lies close to the north point of Pendang creek, which makes it necessary to be cautious not to approach the Nipa bank too closely. After passing Pendang creek the Nipa palms on the port hand may be neared until Edwards point is rounded and the next reach opened, when a vessel should be careful to haul over to the starboard shore, keeping close into the Nipa palm bank, which is now found on that side, in order to avoid an extensive mud flat which surrounds Cameron point, projecting a considerable distance off the pitch of the points; from thence to the junction of this branch of the river with the Santubong branch, the shore on the port hand should be avoided.

This part of the river is known as the Sarawak Junction. Middle point on the starboard hand, faces the reach turning to the westward, which leads to Sarawak; the reach turning to the northward is the Santubong branch. North Junction point is the name of the projection of land which separates the two branches of the river; a clay spit extends from it more than half-way across the river, so that vessels proceeding to the Serail bank, should keep close to the starboard shore as they round into the Santubong branch.

A short distance west of North Junction point are some rocks with 5 feet water lying about 30 yards from the shore. A beacon, marked "Rocks—keep mid river," stands on the bank north of the rocks.\*

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\* Lieutenant J. C. Roughton, 1878,

Sarawak Junction will be known by Seol peak suddenly opening up the reach of the Sarawak river, on the bearings before noticed on the woodcut of the fork at page 94.

Sir Edward Belcher observes :—" The caution necessary, at this stage, is to avoid being forced by the tide on the angle of Santubong reach, on which the first of the Moratabas flood directly presses, and where, if shelved on the clay bank, it is difficult to escape for a tide. The other is, to avoid being cast by the eddy, or Santubong flood, on the mud-bank on the left."

From the Junction to Lumley point the river is clear on both sides with the exception of a one-fathom bank, which extends about 20 yards from the shore, just to the westward of Bradshaw point, abreast of some huts, surrounded by high trees with long bare whitish stems, and which cannot be mistaken. A short distance to the westward of these huts there are but 2 fathoms water in mid-channel, the deepest water being on the south side of the river, or port hand, which is therefore the best side to keep until nearing Lumley point, when a vessel should keep out as nearly in mid-channel as possible.

From the high trees around the huts westward of Bradshaw point, mangrove jungle extends for half a mile, where is the first of three high clumps of trees, of the same description as the others, having long bare whitish stems. In the first clump are two or three trees without any foliage whatever. On coming abreast this clump, be careful to keep in mid-channel, for a little farther on, abreast the second clump, are the Bintawak rocks, which extend nearly a third of the way across, and 240 feet up and down the river. They project in a S.E. by E. direction from the shore ; and their extreme point, over which is 7 feet at low water springs, is 320 feet from the bushes ; the outer one that uncovers is 240 feet from the shore. The outer rocks are sharp, and the deepest water is close to them, but the nature of the bottom is no guide, as casts of soft and hard bottom were obtained almost alternately. A white board is nailed to a tree abreast these rocks, on which is written " Rocks, keep mid-river ; " but a vessel should be in mid-channel before she comes up with the board.

Having passed between the Bintawak rocks and Lumley point, care should be taken to continue as nearly as possible in mid-channel, to avoid the Prima Donna rocks, which lie a short distance to the westward of Lumley point, about one-third of the breadth of the river from that shore ; these rocks are about 160 feet long, in a line parallel with the reach E. by S. and W. by N., and have at low water springs but 2 feet water over their shoalest part, and 8 to 10 feet on each end. They are flat on top, and extend 372 feet from the Nipa bushes, and 250 feet from low water mark ; inside their shoalest part there is a depth of 8 feet, mud

bottom. A beacon, marked "Rocks, keep mid-river," stands on the bank south of Prima Donna rocks; continue in mid-river to avoid the Rowley rocks, which lie immediately off the huts in the bight on the north bank. The outer and western of these rocks lies 90 feet from high, and 70 feet from low water mark, and has 6 feet water over at low springs. Another rock, 60 feet off the shore, has 9 feet water over it, and a third just shows; this last is quite close to the shore. Opposite each of the huts is a large rock on the bank; they both dry at low water, and their tops may be seen at ordinary high water. A sand-bank fronts the south shore the whole distance between Lumley and Rowley points, extending outside the Prima Donna rocks; this bank shoals gradually towards the shore.

When Rowley point is rounded and the next reach, which lies in a south-easterly direction, fairly opened, edge over to the eastern or port side of the river, and keep close to that shore, to avoid the Horse-shoe spit, which projects from Horse-shoe point two-thirds of the way to Rowley point, and extends nearly two-thirds of the distance across the river; this spit is composed of soft mud and begins to show soon after half tide; inside of it there is but 6 feet water.

After rounding Horse-shoe point, keep in mid-river, until the new channel which lies between Dido rocks and Warren point, opens; the marks for the direction of this channel, being a cross board beacon on the eastern shore abreast Warren point, a cross board beacon on the bank north of Dido rocks, and a cross board beacon on the south shore, nearly three quarters of a mile west from Warren point. The Dido or Biyong rocks lie just west of the shingle bank abreast Warren point. One or two of the rocks in mid-channel, show at very low tides; those nearest the south bank have 2 fathoms water over them at low tides. Their position may be known by a few houses which bear about S. by E. from them.

On passing the beacon south of Tanah Putih, steer across the river for the beacon on the north shore, keep the stakes close to on the starboard hand, when  $2\frac{1}{2}$  fathoms will be found in the channel at low water, then steer for the beacon on south side of the river.

The Resident's house (60 feet high) can be seen after rounding Warren point.

The Samarang rocks are 160 feet long, and dry 2 or 3 feet at low water springs; N.E. by E.  $\frac{1}{2}$  E. from their eastern extreme, separated from them by a channel 100 feet wide, in which the least water is 2 fathoms, are two flat rocks, one having 5 feet, and the other 8 or 9 feet over it at low water springs, making the channel northward of the rocks too narrow for safe navigation. The position of the Samarang rocks is well marked by two conspicuous ill-shaped trees below them, and a high clump of cocoa-nut and other trees abreast of them, in the middle of which are some houses.

As these trees are considerably higher than the jungle with which the bank is covered, they will be easily recognised ; just above them the town commences. A white board is nailed to a tree on the south side of the river, abreast the Samarang rocks, on which is written "Rocks—hug this shore."

Abreast the third hut after passing the board, and 80 yards from the shore, lies a pinnacle rock, with 9 feet on it at low water springs ; there is deep water between this rock and the tail of Samarang rocks.

On the south side of the river there is no danger until Crookshank point is neared, off which a hard bank of sand extends some distance into the bight just above the Rajah's house.

On the north bank of the river, in the small bight under the new fort, and opposite the mound above the sago factory, lie Murphy rocks, extending 25 yards from low water mark, and visible at low water springs. These rocks are 60 feet in extent up and down the river, extending from the shore in an E.S.E. and S.W. by S. direction to a point which is 75 feet from low water mark ; they are marked by a tree growing in the water. Close outside of them are depths of 5 fathoms ; at high water sampans go inside of them.

A new fort, built on a hill 60 feet high, comes in sight after rounding Warren point. It is a conspicuous object, having a house, the residence of the officer next in rank to the Rajah, inside of it. The fort, according to the observations of the officers of H.M.S. *Rifleman*, is in lat.  $1^{\circ} 33' 4''$  N., long.  $110^{\circ} 20' 47''$  E.

Some rocks fringe the shore at the foot of the fort hill on its western side ; and a detached rock lies between the Rajah's landing place and the creek to the northward of it.

**Anchorage.**—It has been the custom for H.M. ships to anchor in the reach above Crookshank point, and the *Rifleman* twice anchored there ; but the last time she grounded at low water on a knoll of shingle. The anchorage for vessels of war is off the Rajah's house, but vessels drawing above 14 feet, should anchor more in the bight to avoid the hard bottom shoal off Crookshank point. The best anchorage is a little below the sago factory in the reach between the Samarang rocks and the new fort. Only small vessels should go higher up. Vessels must not, however, neglect the precaution of mooring, wherever they may select a berth.\*

Sir Edward Belcher observes :—"The *Samarang*, as well as the *Dido*, moored in the bight just above the new fort. Both ships found the berth bad,—sometimes in danger of touching upon the slate ledge under the

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\* As the river is about one cable wide at the anchorage below the Sago factory, and less than one cable abreast the Rajah's house, long vessels should moor a short distance on either side of mid-river with a stern hawser to the opposite shore, to ensure swinging in that direction, as the tide turns.—Staff Commander T. H. Tizard, 1879.



new fort, at others of grazing on the opposite shore. Vessels, therefore, of their size, should be very securely moored, the tripping anchor being on the north shore opposite the battery.

“In going out, it is recommended for sailing vessels to warp past the reef\* on the last of the flood, clearing it completely before the ebb can exert any influence. This, although apparently simple, is not an easy operation, owing to eddies and irregularity of the bottom, causing unexpected delays, clearing and recovering anchors and hawsers. With much previous experience the delay, caused by such difficulties, entailed a hard morning's work on the crew before the ship could get away.”

**TOWN of SARAWAK or KUCHING.**—The principal part of the town is on the south bank of the river, where there is a good bazaar and market. The church and bishop's residence are also on this side of the river; and close to the building, half fort and half house, which stands on Crookshank point, are the post office, treasury, and other government offices.

The Rajah's house is prettily situated on a small elevation above the new fort, with one or two bungalows near it for the use of his staff.

A harbour due of five cents per register ton is levied upon all ships or square-rigged vessels entering the port; no charge on leaving.

**Exports, Imports.**—In 1876 the total value of exports was 1,433,139 dollars; of imports, 1,317,665 dollars.

**Supplies.**—Beef and fowls, with sweet potatoes and other vegetables, can be obtained without difficulty.†

**Population.**—The population of Sarawak, in 1878, was 20,000.

**Directions to pass outside the Moratabas.**—Owing to the shifting of the banks at the Moratabas entrance, the exterior line of danger, in 3 fathoms at low-water springs, is no longer represented by a line E. by S.  $\frac{1}{2}$  S. from Po point to Burong island. Unless intending to enter the river, Sipang thumbs should not be brought to the northward of West, until well past the Moratabas entrance.

**LUPAR RIVER** or Batang Lupar,‡ known also as the Sakarran from the Sakarran tribe of Dyaks inhabiting it, lies 29 miles east of Sarawak river. To enter this river bring Burong island to bear S.S.E., or equidistant between West peak and Bliong hill, passing Burong island at a safe distance.§ The mud flat has nearly equal water over it, out it

\* Samarang rocks. Similar precaution appears necessary to clear the Dido, Prima Donna, and Bintawak rocks.

† The Borneo Company employ about three small vessels a month in the export, from Sarawak, of antimony, sago, gutta percha, birds' nests, spices, &c., with an occasional large vessel for timber.—Captain Sir R. McClure, H.M.S. *Esk*, 1858.

‡ Batang is river in Malay.

§ See Admiralty chart :—Borneo, N.W. coast, sheet 3, No. 2,106; scale,  $m = 0.2$  of inch.

was found to be apparently deeper, and the bottom softer, close to the southern coast line (even with the starboard oars touching the mud). The chart exhibits the lines of deep water, but great caution is requisite, as the bore in this river is dangerous to boats, particularly off Nibung point, Aboi point, Siduku point, and under mount Tirow, and in the Linga branch on the turn to Bantang.

For boats or vessels of light draught, the Lupar river may be approached from the northward as before described, but it is necessary to be guided by the direction as well as time of tide, particularly as the ebb tide sets westerly on Burong island.

It will therefore be advisable to keep Burong open of the West peak on a S.S.E. bearing, so as to pass at the distance of a cable from the western side of the island, and edging thence along the southern shore until abreast Bliong hill, when the vessel may be edged over to the island, and observe a mid-channel course, avoiding all projecting points, which are here invariably fringed by sandy spits.

**Bore.**—The young flood brings in a bore, which may be avoided by anchoring in 6 fathoms within the Linga entrance, or in 4 fathoms eastward of Aboi point, until after the first quarter flood.

From the Linga mouth steer, or make good, a course, calculating on a strong flood tide, direct for the bight below Palabahan, in order to avoid the great sand flat of Siduku point.

When the southern reach opens sufficiently to show mount Tirow, a remarkable bluff, S.E., steer for it, hauling directly for the southern hollow bend before Aboi point is shut in by Siduku. From Tirow bluff, in like manner, make for the opposite curve, which will lead safely to Patusan, the point to which the surveying boats penetrated. Attention to these instructions is necessary, or the vessel will be found on the sand-banks.

**Sarebas River** is 12 or 13 miles to the north-eastward of the Lupar. Its entrance has not been surveyed, but Commander Miall, H.M.S. *Mohawk*, 1858, remarks as follows:—"The Sarebas is a larger river than the Rajang. In charge of a pilot, an Englishman in the employ of the Rajah of Sarawak, we proceeded 40 miles, though at night. The soundings are regular and deep. The only necessary precaution is to take the bends of the river (which are numerous) avoiding the spits which extend out from the points.

"The pilot did not consider the river sufficiently clear of dangers to proceed farther in the ship, but the boats went on to the fort some 30 miles higher up. The last 20 miles is very meandering and narrow, but the water is very deep."

**Tides.**—It is high water, full and change, at Burong island at 4h. 45m.; springs rise 7 feet. The flood tide off the island sets S.E.  $2\frac{1}{2}$  knots an hour, and the ebb, N.W. by N. at the same rate; the ordinary rise is 6 feet.

**RAJANG RIVER.**—In this neighbourhood the land is very low, and the Rajang falls into the sea by two mouths, the larger of which is about 45 miles north-eastward of Po point, and 40 miles southward of cape Sirik. As this river is likely to become of some commercial importance, and it will under very careful pilotage admit vessels of 20 feet or more draught, the following remarks are deduced from Lieutenant Gordon's survey.

His anchorage is marked just to the southward of Jerri point, the north point of entrance, and the leading mark given by him is the Lalang branch of the river open, with the south point of the entrance bearing S.E.  $\frac{1}{2}$  E. But on a close inspection of the features apparent on the original chart, it is evident, taking into consideration the course of the flood tide, and the great distance of the above objects used for marks, that it would be preferable when in 5 fathoms water to bring Jerri point to bear East a little northerly, until the inner point, easterly, showed the river open. Enter on the first quarter flood with these marks lapping, when the swell of the last drain of ebb will have subsided, and give Jerri point a fair berth. The general features of the Borneo rivers, within the bars, are very conspicuous here, all the deep water being on the hollow curves, with unmistakeable shoals fringing the projecting points.

Commander Miall, in the *Mohawk*, also proceeded up the Rajang. He remarks as follows:—"Steamed up the Rajang to the fort or stockade, a distance of 25 miles. The water is pretty deep, and there are but few dangers; the anchor was let go off the fort in  $6\frac{1}{2}$  fathoms. The river at this part is very narrow; we experienced a difficulty in turning under steam on that account, as also from the strength of the tides."

Mr. Ricketts, British Consul, in his commercial report for 1865, remarks:—"Vessels of 1,000 tons and upwards could proceed some few miles up the river and find good anchorage either at the village of Rajang, situated at about 4 miles from its mouth, or at mount Sousou, about 12 miles above the village."

From a sketch by Mr. C. C. de Crespigny, 1879, the Rajang appears navigable with care for vessels of 7 to 9 feet draught, about 150 miles from its mouth, the average width of the river, (with the exception of the narrow reaches near Siriki) is about half a mile, and the general depths 3 to 10 fathoms, there is however a depth of only 9 feet at low water in a bend about 45 miles from the entrance, and 7 feet in a rapid about 4 miles below its junction with the Baleh and Balui rivers.

Sabrang point on the south bank of the river just open of Jerri point, bearing East leads over the bar in 3 fathoms at low water springs.

**Tides.**—It is high water, full and change, at the mouth of the Rajang at 4h. 45m.; rise 9 to 13 feet; the apparent depth on the bar at low water (at the time of its survey in 1847) being 3 fathoms. The tides both in this river and the Sarebas are very strong.

**Caution.**—Quitting this river, it is advisable to stand to the north-west into 18 or 20 fathoms before steering to the northward, to round cape Sirik, having due regard also to the state of the tide, as the flood, although setting off shore in 12 fathoms to the north-east, sets, near Sirik, very strong to the south-east, attended by ripples and overfalls, which are peculiarly unpleasant at night, and in the event of a vessel getting becalmed in 6 fathoms, the anchor should be let go without hesitation.

**PALO RIVER.**—Following the coast line northerly from the Rajang, the Balouy river is about 6 miles northward of Jerri point ; it is unimportant, and possibly but an estuary connecting with the Palo river, half way between the Rajang and cape Sirik. The Palo has a small islet on the sandy tongue of its southern point. No observations on the pilotage were furnished by Lieutenant Gordon ; seamen must therefore be guided by his survey, which indicates the deepest water to lie on the east, and by bringing the north and south points of the river to overlap on a S.E.  $\frac{1}{2}$  S. bearing, and steering with these marks on until the islet shows clear of the southern coast trees, the middle spit will be avoided. From this position, steering midway or keeping the village on the south shore on the starboard bow, the flood tide will carry the vessel into deep water off the town. The entrance of this river should, however, be approached with great caution, for the two or three shoal spots on the bar doubtless have—as at the entrances of the Sarawak—shifted their positions since Lieutenant Gordon's survey. The outermost of these shoal spots is placed on the chart N.W. by N., distant 4 miles from the islet off the southern point.

Quitting the Palo river and proceeding northerly, the off shore soundings, between 12 and 6 fathoms, appear to afford sufficient warning until nearing cape Sirik, which should not be approached under a depth of 12 fathoms.

**CAPE SIRIK**, the western entrance point to Bruit river, is low and dangerous, and shoals extend from it to the distance of 6 miles. Vessels should not come nearer this point than 8 miles, nor into less water than 12 fathoms, the soundings decreasing rapidly from that depth to 4 fathoms.

It is not possible to give any reliable instructions for entering Bruit river.

**Tides.**—It is high water, full and change, at the entrance of Bruit river at 3h. ; springs rise 11 feet. The ebb and flood preserve an E. by N. and W. by S. set off the entrance in 6 fathoms.

The tides in the offing set north-eastward and south-eastward, but in shore follow more closely the direction of the coast, and near cape Sirik they will be found to run north and south with a velocity, according to the previous prevalence of rain, from 2 to 3 knots an hour. Northward of cape Sirik the flood tide sets to the south-eastward into Bruit river, and indeed the flood tide will be found to produce a strong indraught into all the rivers, which must be carefully guarded against.

**Directions.**—Proceeding northward from Sarawak river, a good off-shore course must be steered, and allowance made for the flood tide, which runs strong to the south-east on the line between Po point and cape Sirik, but follows more closely the direction of the coast in shore, setting strong into the mouths of the rivers. Matang peak seen over the inner brow of Moratabas peninsula bearing about W. by S.  $\frac{3}{4}$  S., is the danger line for vessels of moderate draught, and Sipang thumb bearing West, for the off-lying shoals of the Sarawak river. Another mark to clear the dangers outside the Moratabas entrance of the Sarawak, is to avoid bringing the high peak of Santubong westward of W.S.W. This mountain can be seen from a depth of 12 fathoms off cape Sirik.

Vessels should, if bound along the coast, make good their offing until Matang peak bears S.W. by S., in 20 fathoms, and thence to the north-eastward in not less than 8 fathoms.

Shoals extend 6 miles from cape Sirik, the flood tide setting strong upon it with a heavy swell; this point should not therefore be neared to a less distance than 8 miles, or under a depth of 12 fathoms, the soundings decreasing suddenly from that depth to 4 fathoms for some miles, and the bottom is soft mud, so soft indeed as not to bring up a vessel in her own draught; but the swell is sudden and very inconvenient, throwing the wind out of the sails and impeding efforts to reach to seaward.

There are no dangers in the offing opposite this part of the coast, but working against either monsoon vessels will have more regular tides by keeping towards the coast. They should always be prepared to anchor as soon as it is evident that they cannot work windward.

**The Coast.**—From cape Sirik to Tatan point, a safe course, recommended, is about E. by N. in 12 fathoms, which will afford an average distance of 10 miles off-shore.\* Proceeding, therefore, on this course in the above depth if making a passage, or in 6 fathoms if intending to call at the rivers, we first meet with the mouth of Igan† (Ballang) river, which runs in a south-east and southerly direction 50 miles where it joins the Rajang at Libou, 56 miles from its entrance. The average width of Igan river is about two thirds of a mile, with depths of 3 to 10 fathoms; at about 19 miles below the junction there is only 12 feet water, in mid-river, but there is said to be 4 fathoms close to the right bank. The entrance, which appears to be nearly north and south with the river open, is barred nearly 3 miles off-shore. A clump of trees on Igan point, the west entrance point of the river, bearing South, until the eastern point is well open, will lead into the river in 12 feet at average high water. The village of Igan is about 2 miles within, on the northern bank.

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\* See Admiralty chart :—Borneo, N.W. coast, sheet 4, No. 2,107; scale,  $m = 0.2$  of an inch.

† From a sketch by Mr. C. C. de Crespigny, 1879.

To the eastward of the Ballang are the rivers Oyah, Panuit, and Judah, but they have not been sufficiently examined to be navigated except by boats; and it should be specially kept in mind, that on all the exposed shores of Borneo, where swell prevails, that the stronger the stream of the river, particularly at the last of the ebb, the greater the liability to dangerous topping rollers. The time of half flood should be preferred for entering, and the last quarter flood for quitting all rivers having shoals to seaward.

The Muka is the next important river in point of trade and population, but it has only 3 feet at low water. The soundings between the Muka and the Neian rivers appear to offer a safe course in 6 fathoms.

The mouth of the Neian, off which Lieutenant Gordon anchored in two positions, north-east and north-west, is obstructed by a bar having only  $1\frac{1}{2}$  feet of water, and from the extent of the shoal line off-shore, offers no inducement to enter.

This is succeeded by the Tatan river, nearly 4 miles W.S.W. of Tatan point, remarkable only for the peculiar mountain of the name, which stands within and gives its name to the river. Mount Tatan is 1,890 feet high, and bears S.E.  $\frac{3}{4}$  E. distant 10 miles from the entrance of the Tatan river, and S.S.W. distant nearly 20 miles from the entrance of the Bintula river.

Farther inland, to the southward of mount Tatan, is a ridge of hills, the most prominent of which is named Table hill. Between cape Sirik and this ridge the land is low.

**THE BINTULA**,\* also a barred river, was visited by the *Samarang* in 1843. The approach, particularly on the ebb, is dangerous. The cutter grounded about 2 miles off-shore, and the swell several times threatened to top. The water deepens suddenly within, and the stream, which was fresh at the last of the ebb, is of a deep reddish hue. The natives, or probably a piratical crew, seen within, did not appear to be well disposed.

Beacons have been placed on Bintula bar showing the new channel, the old channel having silted up. Beacons with baskets mark the points of the spits, and those without baskets, the inner edges.

Vessels entering the river should pass between the beacons, and when between the inner beacons, steer for the fort. There is not less than 5 feet water in the new channel.†

The natives' leading mark is a dead tree on Tupak hill in line with the west point of entrance S.E. by S.

This part of Borneo is now under the Government of the Rajah of Sarawak, by arrangement with the Sultan of Borneo. Trading stations are now established both at Bintula and Muka.

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\* See Admiralty chart :—Borneo, N.W. coast, sheet 5, No. 2,108; scale,  $m = 0.2$  of an inch.

† Sarawak Gazette, dated 16th June 1874.

**Tides.**—It is high water, full and change, at the entrance of the Bintula river, at 5 h. 45 m. ; springs rise 6 feet.

**Acis Shoals** are two coral shoals discovered by the brigantine *Acis*. The position of the eastern shoal is given as lat.  $3^{\circ} 45' N.$ , long.  $112^{\circ} 42' E.$  The other shoal lies on the same parallel, and a short distance to the westward.

The *Rifleman* anchored near the reported positions of these patches, and searched for them without success. It is possible they may exist somewhere in that locality; but as 9 and 10 fathoms are said to be the depths on them, they were not of sufficient importance to detain her.

**The Coast.**—Northerly from the Bintula we pass Kidorong point, where there appears to be anchorage near the shore, and fresh water at a small creek. About 3 miles S.S.E. from the point is a round hill named mount Kidorong.

The coast thence to Breaker bay and beyond appears to be studded by rocky ledges. Indeed this coast, up to Bali point, should be avoided within depths of 12 fathoms by day and 30 fathoms by night. Off Lubong point the *Samarang* was within 3 miles of the white cliffs, when the soundings suddenly decreased from 12 to 6 fathoms, and heavy breakers, with rocks above water, were noticed some distance off-shore.

Lieutenant Gordon observes :—"The large bay contained between cape Sirik and Barram point, as far as we have examined it, appears to be free from danger. About 30 miles E.N.E.-ward from cape Sirik we found the soundings about 7 miles off-shore uneven, varying from 3 to 5 fathoms, sand. A rock also exists off Bali point, about 16 miles southward of Barram point, but it is only 3 miles off shore, and inside the 7 fathoms' line.

"Off-shore we found the soundings very regular for 60 miles, and generally (in May) found a current setting E.N.E. about one knot an hour. Close in-shore the current frequently runs to the southward.

"The principal objects along the coasts of this bay are mount Tatan, 1,890 feet ; mount Silungan, 1,500 feet ; and mount Lambier, 1,550 feet."

**Marabu Village.**—At  $2\frac{1}{2}$  miles northward of Bali point, and 13 miles southward of Barram point, is the mouth of the Meri (or red) river, on the southern bank of which is the village of Marabu, where a considerable trade in bees-wax and camphor is carried on with Borneo and Singapore. The entrance to Meri river is barred, and shoals extend some distance from the coast.

**BARRAM POINT** forms an abrupt bend of the coast, and is fringed by a shoal extending  $2\frac{1}{2}$  miles from the shore. Off-shore the soundings deepen suddenly, with apparently no outlying dangers ; vessels

working up may, therefore, stretch well off this point to the north-westward, so as to make a good board to the eastward.

The Barram river discharges itself into the sea in a W.N.W. direction at the point. The greatest depth over the bar does not exceed 6 feet at low water, but suddenly deepens within to 4 and 5 fathoms; the stream being fresh nearly at the mouth. During the visit of Lieutenant Gordon in April, there was a continuous outpouring stream of nearly 3 knots an hour, but the rise and fall of the river were very inconsiderable.

**The Coast** from Barram point easterly for 45 miles is very low, intersected by numerous creeks, and at 38 miles from the point is the entrance of Ampa river, where there appears to be some trade, and whence several prahus were observed to depart.\*

**AMPA PATCH**, composed of sand and coral, with 5 to 13 fathoms water, lies N.E.  $\frac{3}{4}$  E. 32 miles from Barram point, and 15 miles off-shore. There are 11 to 15 fathoms close around; and at  $1\frac{1}{4}$  miles south-east of this patch there is a depth of 5 fathoms with 14 to 16 fathoms close around.

**VICTORIA PATCH**, discovered by the steam vessel *Victoria*, H.M. Indian Navy, 16th August 1860, lies 9 miles N. by E.  $\frac{1}{2}$  E. from Ampa river, and 5 miles from the shore; it is composed of coral, about a mile in extent, and the least water obtained upon it was 17 feet. At one mile west from Victoria patch there is a depth of 14 feet with 6 and 7 fathoms in the channel between them.

**SCOUT PATCH**, situated  $1\frac{1}{2}$  miles N. by E.  $\frac{1}{2}$  E. from Victoria patch, is composed of coral, about one mile in extent.

H.M.S. *Scout* passed over the edge of this patch, in 4 fathoms. The least water found by the *Rifleman* was 2 fathoms, which lies S.S.W.  $\frac{1}{2}$  W.  $4\frac{3}{4}$  miles from the west Bruni patch, and W. by S.  $\frac{1}{4}$  S. 12 miles from Ketis islet.

The only mark to clear these dangers is a bearing of Ketis islet, which is just visible at a distance of 12 miles. For vessels passing inside the Bruni patches, the safest course will be to keep along the edge of the shore bank in 5 fathoms. But the more prudent plan to adopt, particularly in vessels of large draught, is to pass outside the Bruni patches where there is nothing in the way. The islands Great Rusukan and Kuraman, with the high land of Labuan island, can be seen in time and run boldly for, except in thick bad weather, which seldom occurs on this coast.

**BRUNI PATCHES.**—From the Ampa patch, steering easterly, the water gradually shoals from 17 to 7 fathoms; when on the parallel of

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\* See Admiralty chart :—Borneo, N.W. coast, sheet 6, No. 2,109; scale,  $m = 0.2$  of an inch.



5° N., and with Bruni cliffs (above which Cleared or Bald hills will be seen), bearing E. by S., nearly 10 miles, a series of coral patches will be found, extending 4 miles east and west, and two miles north and south, leaving a channel within of 4 miles free from danger. From these patches, on which 2 fathoms were found, Pisang mount may be seen bearing East.

**IRON DUKE SHOAL.**—During the passage of H.M.S. *Iron Duke*, 1872, from Singapore to Labuan, soundings were obtained in 5 fathoms in latitude 5° 5' N., and longitude 114° 40' E., about 4½ miles N.N.W. of the Bruni patches with the eastern extreme of the Bruni cliffs, bearing S.E. ¾ E.

**Colombo Shoal**, reported by the commander of the Italian vessel *Christoforo Colombo*, 1877, is said to have 5½ fathoms water, and to lie in lat. 5° 13' N., long. 114° 44' E. or 9 miles N.N.E. ¼ E. from Iron Duke shoal.

**Labuan Trader Shoal**, about 9 miles East of Colombo shoal, is reported to have 5 fathoms water, and to be in lat. 5° 13' N., long. 114° 53' E.

**TWO-FATHOMS ROCK**, with 12 feet water and 7 to 11 fathoms close around, lies with Bruni white cliffs, bearing S.W. by S. distant 10 miles, and Bruni bluff S.E. by E. ½ E. 7 miles. Woody peak in line with Bruni white cliffs leads directly on it.

This danger will be avoided working in-shore of it by not opening out Woody peak of the Cleared or Bare hills over Bruni white cliffs, and by not opening Pisang point of Bruni bluff.

**Gunung Malu**, in the interior, is the highest mountain noticed in this part of Borneo. It is in lat. 4° 5' 20" N., long. 114° 55' 8" E., and rises in a conical form, slightly flattened at the apex, to an elevation of 8,000 feet. It can be seen 90 miles, and is visible from Labuan to 20 miles southward of Barram, a range of 100 miles.

**Bruni Bluff.**—The low coast, before-mentioned, as Bruni bluff is approached, is succeeded by elevated land which continues to mount Pisang, exhibiting numerous sandstone cliffs.

Bruni bluff slopes easterly to Pisang point, on which the sea at times breaks heavily. The land rises to 600 feet at mount Pisang, which derives its name from pisang, plantain in Malay. The top of this mount is bare, excepting a small patch of trees on its summit; the range of which mount Pisang is the northern part extends about 12 miles towards the city of Bruni, and exhibits traces of coal throughout.

**PELONG ROCKS**, lying 2 miles North of Bruni bluff, consist of four rocks with deep water close-to, the largest rock being covered with trees; the channel between Pelong rocks and Bruni bluff is safe.

The main channel leading to the E.N.E. from the Pelong rocks may be

safely navigated, even at night, in fine weather. It is about 4 miles wide, and is everywhere safe in 16 fathoms. If in doubt at night, in less than that depth, anchor until daylight, when, if bound either to Labuan or Bruni river, the vessel will probably be found in a convenient position for entering.

**Directions.**—There is nothing in the track between cape Sirik and Barram point, excepting the coral shoals off the Bintula river (page 108), over which there are said to be 9 and 10 fathoms water. Neither are there any known dangers in the offing nearer than the Luconia breakers (page 275). Vessels working against the monsoons will find more regular tides in shore, but they must guard against the indraught of the flood tide into the several rivers.

Between cape Sirik and Tatan point 8 or 7 fathoms will be safe depths to stand into, but between Tatan and Barram points it does not appear to be safe to stand into less than 12 fathoms, the soundings decreasing suddenly from that depth, and the whole line of coast is said to be studded with sudden dangers as soon as the trees can be discerned.

From Barram point to Labuan, or to the entrance of Bruni river, it is advisable to keep westward of all the dangers between Barram point and Bruni bluff.

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## CHAPTER VI.

## NORTH-WEST COAST OF BORNEO.

## BRUNI RIVER TO CAPE AMBONG.

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VARIATION  $1^{\circ} 25'$  East in 1879.

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**BRUNI RIVER.\***—The mouth of the Bruni river was specially examined by Lieutenant Gordon in H.M.S. *Royalist*, and he observes:—

“There are no good marks for entering, and I do not think there could be better directions than those given by Mr. Kirton in the old chart.—Thus: Do not come within  $4\frac{1}{2}$  miles of the south-east point of Moaro island until it is brought to bear S.W. by W. or W.S.W., then stand right for it, as the Moaro reef trends nearly N.E. for 3 or 4 miles.

Moaro reef is all sand, and has two or three small rocks near the sea; it is only dry near the island at low water, but the whole of it is very shoal; coming near it may always be known by the soundings changing from mud to sand.”

This rule of sand is not always a sure guide, as sand will be found on the Sundar spit, and at night, or after sunset, a vessel obtaining 4 fathoms sand, may be induced to steer easterly, and thus become fixed for a tide on the Sundar spit.

Some little experience in this locality, and as far up as the city of Bruni induce the following:—The whole region about the entrance to the Bruni abounds in dangers, demanding extreme caution. Entering by the Moaro shoal, endeavour to keep in 10 fathoms, or until reaching a depth of 5 fathoms, having mount Pisang, 650 feet high, open of the northern extreme of Moaro island bearing W. by S.  $\frac{3}{4}$  S. Or, running down from the northward, bring it on that bearing and steer for Sapo point, until having passed over 5 fathoms, sand, depths of 6 fathoms or less, mud, are obtained.

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\* See Admiralty plan:—Entrance of the Bruni river, No. 2,134; scale,  $m=1\cdot7$  inches.  
J 958. H

If the bearings can be depended on, and the outline of Moaro can be seen (trees northward), this course should lead to the extremity of Moaro spit. Mount Say, 760 feet high, in line with Sapo point, bearing S.W.  $\frac{1}{2}$  W. leads across Sundar bank in 4 fathoms water, although Sapo point is given for a leading mark; it must be remembered that this bare point, recognizable only by one or two stumps of trees, is not sufficiently defined to steer for when beyond 5 miles distant.\*

Bowong point, at  $2\frac{1}{4}$  miles west of Sapo point, is thickly covered with mangrove trees.

Tree Peak, situated 5 miles N.E.  $\frac{3}{4}$  N. from mount Say, in line with Sapo point bearing S.W. by W.  $\frac{1}{4}$  W. just clears Sundar spit in 3 fathoms.

A vessel may steer for mount Pisang bearing W. by S.  $\frac{3}{4}$  S., and until the angle subtended between it and mount Say is  $18^\circ$ , thence steer for mount Say, until the angle is  $22^\circ 30'$ , when the vessel will be in the fair channel in 6 fathoms, mud.

It is important to bear in mind that the ebb tide sets about N.E.  $\frac{1}{2}$  E.; and the flood about S.E. across Sundar spit.

As soon as Sapo point can be distinctly seen, it should be kept a little open south of Tree peak; there is no danger on the west side, and Sapo point must be hugged closely, to avoid the Tapayan sands, the flood running with considerable force past Sapo point. The vessel should be rounded to *starboard*, and the anchor let go immediately on rounding the point, which will insure the best berth.

Vessels anchoring here should have an anchor well to the eastward, as night squalls frequently drive vessels from their anchors.

The ebb tide strikes into the embayed coast line of Moaro, and forces the tide easterly, until it clears the point; precaution should therefore be observed to prevent the tide setting the vessel on to the eastern tongue.

**Water** may be obtained near the beach, but unless driven by necessity, its use should be avoided. It is of a dark colour, strongly impregnated by peat, and probably affected by naphtha springs, or pyrites connected with the underlying coal.

**Directions from Sapo Point to Bruni.**—The course of the river from Sapo point to Bruni,† the capital of Borneo proper, may

\* Sapo point is low, with a few shrubs, but there are high trees about 7 cables westward of it, which are seen 10 or 12 miles. A stranger would not be able to recognize mount Say without a good description of it, on account of the numerous hills. It is a sharp cone, having an elbow at right angles on one side, and is seen over the hills close to the sea shore.—Mr. Russell, Master, H.M.S. *Renard*, 1863.

† See Admiralty plan of Bruni river, No. 1,669; scale,  $m = 3$  inches.

generally be discerned by the lines of fishing stakes, which, at the period of Lieutenant Gordon's visit, appeared to terminate by the fishing stage in deep water, alternately on either bank. Thus, by leaving the first on the left, second on the right, &c., the channel was easily traced by the boats.

Mount Pisang and Bowong point (the south-western extreme of Moaro) in line clears both the Tapayan spits; and mount Say kept open eastward of Jajar ridge leads up to the bar.

On nearing the islands Churmin and Ingaran (literally, Churmin, bright like a looking glass, and Areng, coal), the channel between Ingaran and the main may be taken by boats. But the ship canal has been artificially narrowed by stones laid down, continuous with the reef from Ingaran, so as to compel vessels to pass under the guns of the forts on the north end of Churmin. The result has been to cause the current to cut a deep channel round the point of Churmin, and, entering with the flood, it requires very great caution, from the sudden turn from South to N.N.W., to prevent being thrown on the breakwater to starboard, or the Churmin rocks and a rock with 9 feet water a quarter of a cable N.W. from Churmin rocks, to port. Fortunately the channel then leads to a moderate curvature to the western shore, after which a course mid-channel, and moderate attention to the chart, will carry safely up to the city, the anchorage being at the opening leading to the palace in 6 fathoms.

In January 1866 the bar of Bruni river was resurveyed by Commander Bullock, H.M.S. *Serpent*, who remarks:—The Barou islands may be recognized on approach, the southern being high and rounded, the northern low, with two conspicuous clumps of large trees close together. Mount Say may be known by taking its bearing on approach; it appears the northern of three hills of similar elevation, and has a steep notched shoulder on the right, which is the leading mark; if not made out before, after passing Sapo point it will be the right-hand hill seen over River point.

The bank is very shallow to the north of Sapo point. Round the point at 2 cables distance, and steer West. The weirs are good guides for the edges of the channels. A beacon is sometimes seen on the northern edge of the inner Tapayan spit, and another beacon westward of it on the other side of the channel.

Navigating Sub-Lieutenant R. H. Wellings, H.M.S. *Lily*, 1876, remarks:—After passing Sapo point, steer to the westward, and bring mount Say to bear S.W.  $\frac{1}{3}$  W. open east of Jajar ridge, keeping it on that bearing until Sapo point bears N.E. by E.  $\frac{1}{3}$  E., then steer S.W. by W.  $\frac{1}{3}$  W., and when mount Pisang bears N. by E.  $\frac{1}{3}$  E., a stake beacon should be seen, which leave about half a cable on the port hand, then

steer S. by W.  $\frac{1}{2}$  W., until mount Say appears just clear of Jajar ridge, when the vessel should be between two stake beacons lying E. by N. and W. by S. from each other, thence steer S.S.W., which should lead mid-channel between the beacons on South Bar bank and Barrier beacon.

The *Lily* in crossing the bar at high water by the above-mentioned channel, had not less than 14 feet, soft mud. At spring-tides, 2 feet more water would probably be found. The flood-tide in the channel sets on to the barrier of stones.

In the river above Barrier beacon, considerably less water was found by the *Lily*, in the month of May, than is shown by Captain Bethune's sketch in 1845; and the bank which extends from the north shore of the river, 4 miles above Asing point, has extended farther out since that year.

Vessels proceeding out of Bruni river, in order to avoid Churmin rocks, should not steer for the Barrier beacon until the north extreme of Barou islands is seen open of the north point of Churmin island.\*

**Pilots.**—There are no licensed pilots for Bruni river, and it is difficult to obtain a competent person to act as pilot.†

**Caution.**—The beacons in Bruni river cannot be depended on.\*

**Tides.**—It is high water, full and change, in Bruni river at XI h.; springs rise 12 feet.‡

**Supplies.**—Fresh water may be obtained from a spring near the base of the Kianghi, where the natives will be observed filling their bamboos. The entire range of this mountain, terminating at Bruni bluff, is probably composed of coal, which in many positions crops to the surface.

The market of Bruni, carried on by numerous canoes, supplies poultry, eggs, deer, fruit, vegetables, &c. Money, bottles, iron bar in 4-inch lengths, coloured and plain cottons, are all of value in exchange.

The water buffalo were used for beef; but bullocks of good quality are to be obtained through the Kadyans or Dyak race of this region, the Malays not being a pastoral or farming race.

**The LABUAN GROUP,**§ now a dependency of Great Britain, comprehends Labuan, Kuraman, Burong (or Bird island), Rusukan Besar (or Great Rusukan), (supposed to be connected with *deer*), Rusukan

\* Sub-Lieutenant L. F. C. Jackson, *H.M.S. Sheldrake*, 1876.

† Mr. H. Low, Acting Consul General, for Borneo, 1875.

‡ Commander Bullock remarks:—"From good information from the best Labuan pilot, the ordinary rise at springs is 8 feet, occasionally 9 feet. There is a greater range in November, December, and January. From January to June the high tides occur at night; from July to December in the day time; the intermediate high water rises only  $1\frac{1}{2}$  feet above the mean level."

§ The signification of the word Labuan in the Malay language is anchoring place. In Marsden's Dictionary, it is written Labuh-an; but this has fallen into disuse.

Kechil (or Little Rusukan), Enœ, Pappan (or Coolin Pappan), and Daat.\*

**Labuan**, the largest of the group, is about 10 miles long in a N.E. by N. and S.W. by S. direction, and about 5 miles broad; the northern portion being solid land, and the southern marshy, or intersected by streams.

There is good timber on the north-western face of the island, but it was more easily obtained on the southern portion at the watering place about one mile from Kiamsan point, the south-west point of the island. It was used for boat plank, timbers, and knees, being a tough description of poon, varying much in solidity, from the centre, which was very dense, to the outer coating, which resembled cedar. The watering place is well marked by the termination of a range of casuarina trees at a bright sandy beach at the northern bend of the bay. The supply is abundant, landing easy on a sandy beach, and boats lie safe within convenient distance for hoses. It is almost in connection with a salt-water pool, which may cause some mistake. At low water, large and excellent oysters may be found attached to the rocks, then laid bare.

The north end of Labuan is the highest part of the island, its summit, topped by trees, being elevated 300 feet, and appearing when seen from the north as two peaks of equal height. It is surrounded by sandstone cliffs, and an extensive reef stretches off the northern point; a continuation of this belts the island, offering occasional breaks admitting boats. The northern portion is worked for coal, and convenient anchorage for vessels reddish of any draught may be found off Koubong bluff.

A reef extending from the point off Koubong bluff affords a good foundation for a jetty, but a heavy sea occasionally tumbles in upon this coast during the north-east monsoon; vessels should therefore, in that monsoon, anchor well out in a safe position for getting under way, and veer in for coaling. The best spars can be obtained here, and after rain a stream of water flows over the rocks to the sea.

Fresh dangers are frequently discovered off the northern reef, and great vigilance is necessary, the lead affording no warning; the patches when the sun is visible exhibit a light green hue, and a peculiar heave of the sea may be detected by a vigilant observer.

**Coal.**—The coal mines in Labuan are at the north end of the island. In 1864, 15,600 tons were raised, which considerably exceeded that

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\* See Admiralty plans of Labuan island, No. 1,844; scale,  $m = 1$  inch: and of Victoria harbour, No. 947; scale,  $m = 6$  inches. The description of Labuan and its dangers is chiefly from the remarks of Captain Sir E. Belcher, Lieutenant D. M. Gordon, 1847, and Mr. T. H. Tizard, Master R.N., 1865.

of former years. Vessels at present have to anchor off port Raffles to obtain a supply, but as the anchorage there is exposed to the swell of the north-east monsoon, a railway is in contemplation which will, when completed, allow vessels to coal in Victoria harbour; 3,000 tons of coal are supposed to be kept in store for the use of the Royal Navy and steam vessels calling, but this quantity is seldom complete. Vessels proceeding to port Raffles for coal should anchor in 3 or 4 fathoms water, with the two buoys moored off the jetty in line.

**Supplies.**—Excellent fresh beef can be procured at Labuan.

Fish is plentiful and cheap, and fowls can be purchased at  $2\frac{1}{2}$  to 4 dollars per dozen. The water in Victoria harbour is very bad, and can only be procured at high tide.

With the exception of coal, Labuan produces little or nothing. Some orange and plum trees have been planted by the residents, and they give promise of producing much fruit; the soil is also adapted for the growth of cocoa-nut trees, but the greater part of the island is still covered with a thick jungle, consisting principally of large trees 100 to 120 feet high.

**The trade** of the colony, with the coasts and islands of Borneo, and with the Sulu archipelago, is at present (1876) carried on by boats and native-built vessels, which bring bird's nests, camphor, béche de mer, rice, padi, sago, and sometimes pearls, and they also keep the inhabitants supplied with poultry.

**Shipping.**—During the year 1876 the number of British and foreign vessels entered at Victoria harbour amounted to 35, aggregate tonnage 5,100; cleared 35, tonnage 6,833.

**Exports, Imports.**—The exports in 1876, including coal, amounted to 65,767*l.*, and the imports to 126,594*l.*

**The population** in 1871 numbered 4,898, of which 50 only were whites.

**Mails.**—There is a monthly communication between Labuan and Singapore by mail steam vessels.\*

**Winds and Weather.**—The weather at Labuan is generally very fine; the land and sea breezes are seldom interrupted. A large quantity of rain falls annually, but this generally comes off the coast of Borneo in squalls, which most frequently occur between 8 p.m. and midnight, and blow heavily, especially in June and July. In the south-west monsoon the land breeze, which usually commences with these squalls, lasts until 7 or 8 a.m., and is a steady fresh breeze, whilst in the north-east monsoon it is light and variable, and if blowing hard in the China sea it is not felt at Labuan.

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\* Commander R. H. Harris, H.M.S. *E/4*, 1875.



The sea-breeze in the south-west monsoon usually commences at noon, and lasts until 4 or 5 p.m., seldom exceeding a royal breeze; but in the north-east monsoon it commences earlier, and lasts until 7 or 8 p.m., hanging well to the northward, and blowing fresh. January, February, and March are the dry months; only 2·2 inches of rain fell in those months in 1865.

**Victoria Harbour**, on the south-east side of Labuan, is well sheltered in both monsoons. The general depths in it are from 4 to 10 fathoms, over a bottom of stiff mud, decreasing gradually as the head of the harbour is approached. Moor open hawse to the S.E., as strong gusts from south to east occur, particularly at night. The atmosphere here is oppressive, and unless compelled to remain it is preferable to anchor south of Pappan island, where the full strength of land and sea breezes will be experienced.

The shores of the harbour are bordered with sandbanks, which dry at low water. On the west side they extend off nearly 3 cables, and are interspersed with patches of rocks and stones. On the north side the bank does not extend more than a cable from the shore. Each side they are steep-to; at half a cable from where the sand dries there is deep water.

**Piers.**—From the northern shore of Victoria harbour, nearly abreast the centre of the town, a coaling pier, 138 feet long and 30 feet broad, extends in a S.S.W. direction, terminating in a T-shaped head, 90 feet long, with 15 feet water at its east and 18 feet at its west extreme. About 150 yards east of the coaling pier there is a landing pier (market pier) 187 feet long and 45 feet broad.

**Caution.**—The beacons in Victoria harbour are not to be depended on.

**Tides.**—It is high water, full and change, in Victoria harbour at 9h. 45m.; springs rise 6 feet, neaps, 4½ feet. There are two regular tides in the day, but in the south-west monsoon the night tide does not rise as high as the day tide, and in the north-east monsoon the night tide is highest. In the slack of the monsoon the rise of the tides is equal.

The direction and strength of the tides are in a great degree influenced by prevailing winds outside occasionally sending in a sudden swell.

**Rusukan Kechil**, one of the group of islands off the south-west extremity of Labuan, was selected by Sir E. Belcher for the astronomical position, being convenient for the survey, and solid ground. Its eastern sandy tongue is the point on which the observations were made.

Vessels visiting this group, simply for rating chronometers on Rusukan Kechil, should give it a clear berth to the southward of 3 miles, hauling up when the western extremes of Rusukan Besar and Kuraman are in line, and avoiding the 2½ fathoms patch to the south-eastward of the former, by bringing Rusukan Kechil in line with either extreme of Kuraman, and

anchor in 11 fathoms about one mile east of Rusukan Kechil, where good landing may be found on the northern beach.

**Barat Bank** has 2 fathoms on it, and its outer extremity lies S.W.  $\frac{3}{4}$  W.  $3\frac{1}{2}$  miles from Rusukan Besar, the soundings decreasing suddenly from 30 to 10 fathoms near it. It is therefore prudent not to haul up for Rusukan Besar until it bears N.E., preserving the depth of about 15 fathoms on an E.N.E. course until Rusukan Besar is open westerly of Kuraman, when the course to Pappan is free from danger.

Lieutenant Gordon observes :—“ Between the south-west point of Labuan and Kuraman is a passage between reefs, but I do not consider it safe.” \*

**Trident Shoal**, lying S.S.W.  $\frac{1}{2}$  W., nearly a mile from Enöe island, is composed of coral 400 yards long, N.N.W. and S.S.E., and 100 yards broad with only 6 feet on it at low water. The north extreme of Daat island just touching the south end of Pappan leads southward, and the column on Ramsay point open east of Enöe leads eastward of Trident shoal. There is a passage 2 cables wide, with a depth of 6 fathoms, between it and the shoal extending from Enöe island.

**Enöe Island.**—The shoal surrounding this island consisting of sand with occasional patches of rocks and stones, extends 7 cables to the northward,  $3\frac{1}{2}$  to the southward, and 3 cables to the eastward of the island, and on the west side joins the coral reefs stretching out from Labuan. A beacon (consisting of stakes lashed at the top) is placed on its north-east extreme in 4 fathoms water, with the summit of Enöe bearing S.W.  $\frac{1}{2}$  S., distant nearly 7 cables, column on Ramsay point N.N.E., one mile, and extreme of mangrove on Hamilton point West, nearly 8 cables. The shoal is steep-to on all sides ; at a cable distant from where it dries are from 6 to 7 fathoms water.

**Pappan Island**, flat, and covered with trees, the tops of which are 124 feet above the sea level, is surrounded by a shoal which extends a cable from the north, 2 cables from the west, and 3 cables from the south shore, and to the eastward it is only separated by a small passage three-quarters of cable wide from the reefs extending from Daat island and the main coast of Borneo. A beacon is placed on the south-west extreme of the shoal in 4 fathoms, and from it the south-west end of Pappan bears N.E.  $\frac{1}{2}$  N.  $2\frac{3}{4}$  cables, the summit of Enöe W.  $\frac{1}{4}$  S.  $1\frac{1}{2}$  miles, and the column on Ramsay point N.N.W.  $\frac{1}{4}$  W.,  $1\frac{1}{2}$  miles.

**Outer Shoal**, lying between Pappan and Enöe islands, consists of coral, is a cable in extent, and has only 3 feet on it at low water. A

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\* The Peninsular and Oriental Company's steam vessel *Formosa*, 1856, struck on a rock in the centre of the channel between Kuraman island and Kiansan point, with the latter bearing N.N.E.  $\frac{1}{2}$  E., and Burong island East. No further examination was made, but the rock was supposed to have 10 feet water over it at low-water springs.

buoy with a black ball is placed on the centre of this shoal in 7 feet water,\* with the column on Ramsay point bearing N.  $\frac{1}{4}$  W.  $1\frac{2}{10}$  miles; summit of Enöe island W. by S.  $\frac{3}{4}$  S., nearly a mile; Pappan beacon E. by S.  $\frac{3}{4}$  S., two-thirds of a mile; and Enöe beacon N.W. by W.  $\frac{3}{4}$  W., half a mile. The passage between Outer shoal and Pappan beacon is 6 cables wide, and has depths of 12 to 25 fathoms; the passage between it and Enöe beacon is 4 cables wide, and has 9 to 11 fathoms.

**Harbour Shoal**, lying between Ramsay point and Enöe island, is a small coral patch, half a cable in extent, with 9 feet least water on it. A buoy with a white ball is placed on the centre of this shoal in 7 feet water, with the column on Ramsay point bearing N. by E.  $\frac{1}{2}$  E., distant 6 cables. Outer beacon S. by E.  $\frac{3}{4}$  E.,  $6\frac{1}{2}$  cables; and Enöe beacon S.W. by S.,  $4\frac{1}{2}$  cables. Vessels may pass on either side of this shoal.

**Columbine Beacon.**—From Ramsay point the shoal water extends in an E.S.E. direction for 7 cables, when it turns to the E.N.E., and curves gradually to the northward. The edge of this bank is marked by the Columbine and Inner beacons.

The Columbine beacon, surmounted by a black ball, is in 3 fathoms water, and from it the column on Ramsay point bears W.  $\frac{1}{4}$  S., nearly a mile; Collier Head N.  $\frac{3}{4}$  W.,  $9\frac{1}{2}$  cables, and the south-west point of Pappan island S.  $\frac{1}{2}$  W.,  $1\frac{1}{4}$  miles.

A short distance north-eastward of this beacon, lies a small patch of coral with 9 feet on it, just detached from the edge of the 2-fathoms line of soundings, but inside the line of 3 fathoms. The centre of this patch is N.E. by N.,  $1\frac{3}{4}$  cables from the beacon, the 3-fathoms line of soundings extending in a N.E. by E. direction  $1\frac{1}{2}$  cables from the beacon. In the channel, one mile wide, between Columbine beacon and the shoal off Pappan island, the soundings are irregular, from 9 to 20 fathoms.

**The Inner Beacon** marks the edge of the shoal water half-way between Columbine beacon and Ramsay point. It is in 12 feet at low water, and from it Columbine beacon bears E. by N.  $\frac{1}{2}$  N., distant half a mile; the column on Ramsay point W. by N., half a mile; and Collier Head N. by E.  $\frac{3}{4}$  E.,  $1\frac{1}{8}$  miles. Between these two beacons the edge of the shoal curves to the southward and eastward; between the Inner beacon and the column on Ramsay point there is a coral patch of 6 feet and another of 4 feet, detached from the edge of the bank, which extends  $1\frac{1}{4}$  cables to the southward of a straight line joining the column and beacon. Both patches are steep-to, and to avoid them keep Columbine beacon open of the Inner beacon, whilst the column on Ramsay point bears westward of North.

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\* It has been proposed to moor this bay on the eastern extremity of Outer shoal.

**Directions for South Channel.**—In working into Victoria harbour from the south-west, \* Pappan open to the northward of Daat leads east of Trident shoal, and Burong island in line with Kiamsan point leads south of it. The flood tide runs strong near Pappan island, and from the prevailing winds it was found advisable to hug its western side, making short boards to the north-east, until a course could be steered for, Victoria harbour grazing the northern dangers. Work up under the south side of Pappan until the vessel can weather Enöe. Tack on the first cast in 10 fathoms; Rusukan Ketchil must be kept open of Enöe until near Pappan, which is bold-to on the west side, tack before the vessel is swept past its northern end, into the eddy; tack again in 10 fathoms before Besar Rusukan peak opens west of Enöe; this will clear the 6-feet patch, on which Burong island will be seen clear of Hamilton point. When the northern bluffs are seen open of Collier head, the vessel will have a leading wind into Victoria harbour. Keep Burong just shutting with Hamilton point until the harbour beach opens, when the vessel may round the tongue, extending  $1\frac{1}{2}$  cables south-eastward of Ramsay point, by keeping in 6 fathoms.

† Vessels wishing to sail in or out of Victoria harbour should always take advantage of the land and sea breezes, instead of attempting to work in. Arriving in the afternoon or at night, it is better to anchor in 10 or 11 fathoms, about half a mile south of the Outer shoal, weighing at daylight the next morning, and running in with the land breeze; and in leaving the harbour wait for the sea breeze between noon and 1 p.m., which carries a vessel with a fair wind past all danger.

**North Channel.\***—In leaving Victoria harbour by this passage, enter mid-channel between the shoals off Ramsay point and Daat island, with Burong island open of Hamilton point, and when the south-east point of Daat shuts in with its south-west angle, and Multancassan island opens off its northern point, a N.  $\frac{3}{4}$  E. course may be steered, which, with the tide, and edging easterly on any cast less than 5 fathoms, will carry the vessel out in not less than that depth.

Mr. H. S. Ley, Master, H.M.S. *Cormorant*, 1857, remarks:— In taking this channel, vessels should steer so as to pass to the north-eastward of the beacon marking the shoal ground south of Collier head, and when the rocks at about half a mile to the westward of Daat island (which are well above water, and easily to be distinguished) bear S.S.E. or S.E. by S. steer N.  $\frac{3}{4}$  E.

In approaching from the northward steer for mid-channel, but withal nearer to Lubedan. Not less than  $4\frac{1}{2}$  fathoms water will be found on that

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\* Sir Edward Belcher.

† Mr. T. H. Tizard, Master R.N., 1865.

shore, until Lubedan opens from the distant tall trees of the north-east coast; then proceed direct for Pappan island, and when Burong opens steer for the town point, and anchor as before.

**Kalias River.**—H.M.S. *Algerine*, September 1870, steamed about 16 miles up Kalias river to Kalias village. Lieutenant Commanding H. R. E. Grey remarks:—To enter this river keep the north rock off Daat island in line with the south end of North Multancassan island, bearing E. by S.  $\frac{1}{2}$  S. until the cocoa-nut trees are shut in with the high trees on west side of Daat island, when an E.  $\frac{1}{2}$  N. course should be steered (with the jail on Labuan astern, bearing W.  $\frac{1}{2}$  S.) which will lead 2 or 3 cables northward of the north rock off Daat island. The jetties at Mempakul should be kept just shut in by Kalias point until within 3 or 4 cables of that point, then open them, keeping nearer Kalias than Multancassan.

After passing the village of Mempakul there is a mud bank extending from that shore, and a sand bank on the starboard side, but the channel is wide; leave the first island on the starboard side, and the second on the port side. After passing this island there is only one danger, which will be avoided by keeping close to the left bank; the bends of the river are sharp, and the reaches narrow above Gerama junction at about 8 miles from the entrance; only small native boats can pass through to Kimánis bay.

**Tides.**—At low-water springs there is 5 or 6 feet water on the bar of Kalias river; rise about 6 feet.

**ROUTE from LABUAN to the PALAWAN.**—The Admiralty chart, sheet 8, of the N.W. coast of Borneo, will enable vessels to proceed safely as far as the Deluar reefs, which may be passed on either side. The safest course, then, appears to be inside the Mantanani islands along the coast of Borneo until abreast Sampanmang point. The Admiralty chart, sheet 9, exhibits no danger by this route, and H.M.S. *Rifleman* on a S.E. by S. course from the North Furious shoal for 18 miles, carried regular soundings the whole way. The route outside the Mantanani islands cannot be relied upon as a safe track for shipping until it has been more thoroughly examined. The Furious shoals, and the 4 fathoms bank 17 miles S.S.W. from the Mantanani islands, passed over in the *Rifleman*, together with other patches which are shown in faint outline upon the charts, indicate the great probability of the existence of dangers yet undiscovered.

Sir Edward Belcher makes the following observations on proceeding to sea from the northern part of Labuan:—

As regards off-shore dangers; the patches to the northward rise suddenly; that in lat.  $5^{\circ} 39' N.$ , long.  $115^{\circ} E.$ , was threaded by H.M.S.

*Samarang* and *Vixen* at 1 p.m. in 4 and 5 fathoms; and at 7 p.m., after running south-eastward 18 miles, the soundings were 85 fathoms.

North, 13 miles from Bethune head, there are several patches of 5 and 6 fathoms, named Gordon patches, probably, by Lieutenant Gordon, but no account has been furnished.

Having passed through the north channel, the safest course for vessels of large draught would be to make a direct course to the north, nearly on the meridian of the high hills of Labuan, until arriving on Gordon patches or reaching the latitude of  $5^{\circ} 45' N.$ , in 20 fathoms, when an easterly course may be shaped to make Pulo Tega. This will avoid the Jehat, Winchester, and Nosong shoals, and lead to the channel southward of the Tega group, much more reliable than the narrow opening between the Deluar and Tega shoals, unless a good berth be given at 10 miles from the northern Tega islet, which, simply for making a passage, should be preferred.

Other duties, or inducements, may lead the navigator along the coast line, off which safe anchorage will generally be found.

At 7 miles N.N.E. from the north extreme of Labuan, deep water (15 or 20 fathoms) will be gained. Hence a N.E. by E. course in depths from 11 to 14 fathoms may be observed, and the Pine point shoals avoided by moderate attention to the bearings of the elevations marked on the chart. As a general caution for distance from this coast line and limit of shoals the base of the trees on the beach should not be distinguished when off Pine point.

On the other hand, similar precaution is necessary not to render them indistinct (distances of 5 and 10 miles would), which will keep the navigator within the limits of the Jahat dangers. Having touched several of these dangers, we may observe that due caution, now their existence is determined, is given by the lead, and the heave of the sea will always give warning of shoal water. Independent of this, whenever the sun is abaft either beam, or on the back of the observer, the bright green hue of the shoals is distinctly visible.

The preceding remarks especially apply to vessels of heavy draught; but to vessels not exceeding 14 or 15 feet, the inner passage within the shoals may be taken at  $1\frac{1}{2}$  miles from the coast line. If proceeding easterly, keep Lubedan islet barely clear of Toulak point; or if westerly, the south-east extreme of Tega and Nosong barely in contact, apparently opening as the vessel recedes from Tega.

**JAHAH SHOALS** (literally bad, or danger) were examined by Lieutenant Gordon, and are thus described by him:—"Jahat bank, the principal and most dangerous reef, is of coral, and horse-shoe form,

bearing N.E.  $\frac{3}{4}$  N. from the north point of Labuan and N.  $\frac{1}{2}$  E. from Lubedan. It has 6 feet water on its eastern and only 3 feet on the south-western part; there is deep water all round except on the north side, where depths of 5 fathoms extend for a considerable distance, and there may be less; and there is a passage through the north-west or centre part of it."

**Growler Bank**, lying about 6 miles north-east from Jahat shoals, is about half a cable in extent, with  $5\frac{3}{4}$  fathoms water. From the centre of this bank the south-east extreme of Tega island bears E. by N.  $\frac{1}{2}$  N.; Nosong point E. by S.; and mount Nosong E.S.E.

**NOSONG SHOALS**, situated N.E.  $\frac{3}{4}$  N. 9 miles from Jahat shoals, and West from the south point of the largest Tega island, is composed of coral with two small sand patches nearly level with the sea, or awash at high water. From these patches, on which the sea invariably breaks, the shoals extend  $1\frac{1}{2}$  miles N. by E., and the ground is very uneven on the south-west part.

The north Tega or Burong island, which is high and conspicuous, clear of great Tega island leads southward; Tangout rock shut in with Nosong eastern extreme leads eastward; and Turtle or the second Tega island open of great Tega island leads northward of Nosong shoals.\*

**PULO TEGA GROUP**, which derives its name from Tega, three, is composed of three islands, Tega, Turtle, and Burong, situated 6 miles north of Nosong point, termed by the natives Tanjong Pulo Tega, a matter of importance when communicating with the coast people of Kimánis bay.

The group stands on a coral bank extending about 5 miles N.N.E. and S.S.W. The largest island affords good anchorage under its centre in the southern bay; but a shoal with 2 and  $2\frac{1}{2}$  fathoms over it extends from its eastern extreme in a southerly direction for the distance of a mile, close to which are 14 fathoms. A shoal patch with but 2 fathoms on its outer end also lies W. by S. from the western extreme of the island, the outer part of which is distant  $1\frac{1}{4}$  miles; close to this shoal are 7 to 9 fathoms. Mr. Russell of H.M.S. *Renard* says that a coral rock with 6 feet water over it lies about half a mile to the westward of the south-east point of the island, and about the same distance from the shore.

All the timber is casuarina, which is easily cut, when green, by saws, and forms excellent fuel, levers, handspikes, &c.; but in its dry state is hard as lignum vitæ. The beach is adapted for the seine, but mullet only were taken.

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\* See Admiralty chart:—Borneo, N.W. coast, sheet 8, No. 2,111; scale,  $m=0\cdot5$  of an inch.

There are 3 fathoms water between Tega and Turtle island, but the passage is not recommended. The dangers, however, which consist of knolls of several feet diameter, can be seen with the sun in a favourable position.

Turtle and Burong islands occupy a patch 3 miles in extent, and the channel is only passable in light boats.

The northern island received the name of Bird (Burong) from the quantity of birds' deposit. It is high, and bold-to on its south-east side, where good anchorage was found in 9 fathoms. The trees are useless.

**Deluar Reefs**, on which the sea breaks, lies  $2\frac{3}{4}$  miles N. by E. from Tega shoals; these reefs are steep-to and extend 4 miles in a N.N.E. and S.S.W. direction, with rocks above water near the centre, from which the east extremes of Burong, Turtle, and Tega islands are in line bearing S.  $\frac{3}{4}$  W.

**KIMÁNIS BAY**, so retained in compliment to the name given by Dalrymple, as well as to the commercial importance of the river of the same name, is an extensive bight, free from danger, and lies immediately to the eastward of Nosong point.

**Kapala River** (Kuala-panko), in the south-west bight of Kimánis bay, will admit at high water vessels drawing 12 feet, or it can be entered at all tides in smooth water, by a draught of 4 feet. It was examined about 3 miles within its mouth; there is a depth of 4 feet on the bar, with deep water within, but being salt (*garam*, native), and without any current force, was deemed to be merely an estuary. No natives were seen either within its mouth or in the immediate neighbourhood. One advantage this river seems to possess over any other in Kimánis bay is, the freedom from rollers, and complete protection for boats from all winds westerly of North. The water of the river is stated to be fresh near its source, but the weakness of its stream renders this doubtful.

**Lama River**, situated about 3 miles to the eastward of Kapala, is barred by rollers in bad weather, but in smooth water may be entered at high water by boats drawing 5 feet. At low-water springs, it probably would show dry, or possibly offer a very narrow boat channel. Its stream is rapid, but the people who inhabit its bank are designated by those of the Kimánis as treacherous bad men (*orang jahat jahat*); and the specimens which presented themselves at the period of the visit were insolent and inclined to give trouble. Lama river is said to be fresh within, and the strength of the ebb, with the attending rollers, warrants the supposition.

**The Membákut** is an insignificant stream in the depth of Kimánis bay. It is similar to the last, but no natives were seen.



**KIMÁNIS RIVER**, the entrance to which is in the eastern bend of Kimánis bay, has shoal water extending a considerable distance off its mouth, which, at low tide, is entirely barred to the smallest boats. At high water, prahus of some size, drawing probably 6 feet water, enter the river by the southern channel, which will not be discovered until rounding the tail of the rollers extending to the south-west, which overlapping, at first sight apparently forbid any attempt to enter; the deep water will be found by rounding the southern extreme of the rollers.

A fair trade was carried on with these people, but evidently controlled by the Malay authorities acting for the Sultan of Bruni. These reside at the beach, and the market prices for the products of the interior, brought down by the Kadyans, are materially influenced by their interference.

This is one of the rivers said to flow sweet into the sea, and its name is probably derived from this fact, Manis being the Malay term for sweet, although tawar would more probably express fresh water. There can be no doubt that at particular seasons this river flows into the sea with great force, hence these extensive banks. It happened to be an unusually dry season when the visit was made, in April, and the natives endeavoured to impress on us the fact that all the rivers were very low.

The Kimánis river forms the boundary of the territory ceded to Great Britain in 1763, as well as the jurisdiction of the Sultan of Bruni, or Borneo Proper; our relations, therefore, with the people are likely to become more important to commerce, as this river is one of the principal trading connexions with the interior, as well as with the city of Bruni, to which it sends seed-pearls, camphor, beeswax, vegetable-wax, pepper, &c.

**Supplies.**—The people were found (probably from the political position of those engaged in the murder of Budderuddjn, &c.) very difficult to deal with, capricious in bargaining, particularly with regard to bullocks, which were here of the most convenient size for embarkation, excellent in condition, and superior to any others purchased on the coast.

Goats, ducks, fowls, vegetables, fruit, pepper, beeswax, camphor, parrots, &c., were obtained at very low prices.

Watering here is inconvenient, as the natives must be relied on to fill and bring the casks to the boats.

**Watering Place.**—At about 4 miles northward of Kimánis river will be found a space of 20 acres of clear land, fringed at the beach by a line of casuarinas, and close to the small river Benoni to the northward. Immediately within the trees and parallel to the beach, the water will be found in a canal, 200 yards long, 30 wide, and in general seasons may afford a mean depth of 5 feet. The water is excellent, and is probably in the course of constant filtration to the sea. Boats can lie safely within reach of the hoses, and the vessel can anchor at a convenient distance, or

within a cable, in  $3\frac{1}{2}$  fathoms, soft mud. The depths decrease suddenly, but the Malays or Dusuns (for what purpose could not be ascertained) have staked the ground into 4 fathoms, and the stakes form excellent beacons for the danger line.

Particular stress has been laid in describing this locality, as we found ourselves frequently deceived in replenishing water at places where positive information of its existence was given; it certainly was to be found, but attended with difficulties which rendered it barely worth the labour incurred, independent of delay and wear of boats and engine hoses.

**The Benoni** is probably connected with the above watering place, and during the freshets, floods the neighbouring flat before described as cleared land. It may be entered by light boats at high water, but at the period visited it was difficult.

**The Minani**, about 3 miles north of the Benoni, is barred, but, like the latter, can be entered by boats at high water. It runs parallel to the beach northerly about one mile, in the direction of the high hummock or peak of Kinindúkan, which forms by its bluff Dukan point, the north-eastern point of Kimánis bay. No traces of natives were observed. Indeed, with the exception of Kimánis river, the only individuals noticed were the wandering Bajows, sea gipsies, or fishermen of these coasts.

To the northward of Kinindúkan bluff, the coast dangers recommence, but are easily avoided by due attention to the soundings. The inland ranges rise suddenly, attaining heights of 1,500 and 2,000 feet. The rivers are insignificant, and do not offer any inducement for trade or other purposes until reaching Gaya bay.

**Caution.**—From a very general intercourse with all the tribes Malay, Bajow, as well as the Dyak or mountain races, it was apparent that by kindness and firmness they are disposed to be friendly. Timidity, or too much suspicion on the part of visitors, naturally renders them cautious. They are, from the knowledge of their own weakness, compared to Europeans, timid and suspicious, and when they behave with apparent treachery, there is reason to suspect, if the truth could be known, that their acts result more from a view of self-preservation than from any feeling of revenge, desire for plunder, &c., and nothing is so much calculated to inspire this suspicious feeling than an injudicious timidity or armed truce, which is almost invariably resented by them with derision, the precursor of bad feeling, insult, or hostility. Our connexion with Borneo Proper will doubtless soon dissipate this timidity and fear of collision with the coast people. But caution is imperative in all transactions with the Malay race.

**Pulo Lyang** (Llāngliangan) situated N.  $\frac{1}{2}$  W.  $3\frac{1}{2}$  miles from Dukan point, and 2 miles from the nearest shore, is high, steep to, and

may be passed at a distance of one mile, at night it may be mistaken for a vessel under sail; between this islet and Gaya island, vessels should not decrease their soundings to less than 15 fathoms.

**GAYA GROUP and BAY.**—Gaya island, situate 15 miles N.N.E.  $\frac{1}{2}$  E. from Pulo Lyang, is  $4\frac{3}{4}$  miles long W.N.W. and E.S.E. about 2 miles broad, high, well wooded, and nearly connected with the main by an extensive reef. Sigiata or Loney islet, nearly adjoins the south-west point of this island. Manúkan, Mamuli and Sulúg are three small islands between 2 and 3 miles south of Gaya island; within these islands there is safe anchorage.

Gaya bay is formed by the northern point of Gaya island and Tanjong Kaetan, which has a remarkable peak (Kaetan peak) about 3 miles to the northward. Sapangár, Udar, Udar Kechil, and Udar Tega, are a group of islands on the north side of entrance to Gaya bay, and form the land-locked anchorage in Sapangár bay, the most secure harbour on this coast.

Between Sapangár and Gaya the main channel is safe. The channels between the other islands, are unsafe, being liable to sudden calm, currents, and gusts. The outer navigation is safe, but the lee side of Sapangár should be given a wide berth or the vessel will be becalmed.

The coast extending from the Gaya reef, along the bight of the bay as far north as Udar Tega, is fronted by coral and shoal patches, extending about half to three quarters of a mile from the shore; but there is ample and safe anchorage within the bay.

**Inaná́m River** the entrance to which is difficult, even for boats, is situated on the east side of Gaya bay; it is believed to be of very little importance, except for the purposes of fishing. The natives, who appear harmless, are under the control of a chief of the neighbouring river Kabatúan.

**Kabatúan River** situated 3 miles north of Inaná́m river may be distinguished, when abreast its entrance, by a yellow sandstone bluff on its northern, and the abrupt angle of the coast on the southern, shore.

The main or upper bar appears to be composed of coral knolls, being a continuation of the line of reef extending from the Inaná́m. There are gaps in this through which, at high water, small vessels might enter the river. The mouth is nearly closed by a small sand delta, near the southern end of which the deepest water was found.

The report of the natives led us to expect a supply of fresh water within this delta, but the engine sucked the well dry in a few minutes. Water however, flows in small drains throughout these parts, supplying about 10 gallons in a quarter of an hour. A few miles within the river the water is fresh, and is said generally to flow fresh into the bay, but the season was too dry; water may be obtained from the natives if a person be sent up the river with them.

The **Kabatúan** is the principal trading river of this region, and is governed by the **Pangeran Madáout** (who is here styled **Sultan**), one of the brothers of the late **Rajah Nuda Hassim**, and uncle to the **Sultan of Bruni**. Taking into consideration the security of the harbour, as well as the facility of communication in all weathers, added to the character of its governor, this may be considered as the safest and, at present probably, best trading position on the coast.

Under the impression that the object of the visit was to trade, the canoes which came down were laden with beeswax, camphor (*barus*), shark fins, edible birds' nests, tortoise-shell, fowls, ducks, fruit, &c., and probably many articles, as gold, pearl, stones, &c., which were kept concealed until they ascertained what would be given in exchange.

In the deep bight north of **Kabatúan** river there are several shoals; on the east side about three-quarters of a mile from the shore lies a rock, which is marked by a beacon.

The outer islands are surrounded by deep water, and are uninhabited.

**Anchorage.**—Mr. Russel, Master, R.N., remarks:—H.M.S. *Renard*, 1862, anchored off **Gantison** at the head of **Sapangár** bay in 7 fathoms with the following bearings: **Sapangár** island, south-east point, S. 66° W.; a mud cliff to the westward of the Prince's house, N. 23° E.; valley eastward of Prince's house, N. 58° E. A red flag with a white centre (the **Sulu** flag) was hoisted at the Prince's house. We might have gone some way closer in shore by keeping the mud bluff N.N.E.  $\frac{1}{2}$  E., the coral on all sides being visible.

**Tanjong Kaetan** is the inner bluff, near the islands; the outer bluff, named **Gaya** head, is steep-to, and has no off-lying dangers.

**MENKÁBONG BLUFF**, about 5 miles N.E. of **Gaya** head, is a high crowned peninsula, fronted by a reef, with a sandy beach connecting it with **Menkábong** river, which is about 2 miles to the south-west.

**Menkábong River** can be entered by vessels drawing 7 to 8 feet. The inhabitants are apparently friendly; their village is a short distance within the entrance of the river. They offered dried fish and rice, and appeared to be poor fishermen, *Bajows*. This river is designated *garim* and *asin*, salt, but from the colour of its waters, strength of the stream, and vicinity of high land, we have reason to suspect it to be fresh not far within. Moreover, the natives seldom construct villages at any distance from fresh water.

**Directions.**—Before proceeding farther along the coast, the observations of **Lieutenant Gordon, R.N.**, on the outer navigation, will be recorded:

“Vessels working up must not stand too far off, as there are numerous reefs off the east side of Mangalum, which island is W.N.W. 24 miles from the north-west point of Gaya island. Off here at 7 miles from the shore, during the strength of the north-east monsoon, a strong current was found setting to the north-eastward.”

**Saracen Bank**, *see* page 278.

**MANGALUM ISLAND**, the south-west point of which is in lat.  $6^{\circ} 10' 40''$  N., long.  $115^{\circ} 35' 20''$  E., is nearly round, 4 miles in circumference, and very low, the highest part of the ground being only a few feet above the level of the sea; the tops of the trees are visible from a small deck about 12 miles. It is surrounded by a coral chain, broken only at the south-east portion, where vessels may enter and anchor close to the shore.

To the south-westward the reef extends 6 miles, affording an intricate passage. Off the east end, rocks, on which the sea breaks, and coral patches extend several miles.

On the north side, for 10 miles, the soundings are very uneven, shoaling suddenly from 20 to 5 fathoms.

On these patches not less than  $4\frac{1}{2}$  fathoms water were found, although they were sounded across several times.

**Water**.—At the period of Lieutenant Gordon's visit, in January, there was much fresh water in ponds close to the beach, which communicated with a swamp in the centre. This water, although fresh, was much impregnated with vegetable matter.

**Wood** for fuel and other purposes is abundant; the trees grow straight, and there is great variety.\*

**Tides**.—From four days observations in the month of January (*viz.*, from the full moon to the fourth day after,) it was high water at Mangalum island invariably about 11 p.m. and low water at 6.45 a.m., the greatest rise of tide being 5 feet; there was only one flood and ebb in 24 hours.

The night tides greatly exceeded those by day.

**Bank of Soundings**.—H.M.S. *Dwarf*, in August 1876, struck soundings on a bank which lies between lat.  $6^{\circ} 22' N.$  and  $6^{\circ} 16' 30'' N.$ , long.  $115^{\circ} 51' 10'' E.$  and  $115^{\circ} 46' 25''$ . The vessel was steering S.W.  $\frac{3}{4}$  S., and the first cast obtained was  $9\frac{1}{2}$  fathoms, bottom distinctly visible; the shoalest cast was 6 fathoms, sand; the general appearance of the bottom, coral with rocks interspersed. From the north end of the bank Kaetan peak bore S.E., north extreme of Mangalum island S.W. by W., centre of Gaya island S.S.E.  $\frac{1}{4}$  E. From the south end of the bank Kaetan peak bore S.E. by E.  $\frac{3}{4}$  E., north extreme of Mangalum island S.W. by W.  $\frac{3}{4}$  W.,

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\* Mangalum island is or was a common rendezvous for piratical proas.—Mr. J. W. Reed, Master, R.N., 1864.

centre of Gaya island S.E. The nearest part of the main land, Gaya head, was thus distant 20 miles.

**Tawálan (Kawalan) River.**—From Menkábona bluff the coast trends N.E. by N. about 4 miles, to the mouth of Tawálan river, off which there is an extensive sand flat ; in the entrance there is a spit dry at low water, boats can, however, enter from the south, on the first quarter ebb. Within, is a large village of huts, inhabited solely, it is asserted, by the Bajow fishermen, some of whom brought presents of fish, and appeared disposed to be friendly.

There is a depth of 3 fathoms within the bar, which is not troubled by rollers, and the river is reported to be navigable for boats as far as Kini Balu lake. Dalrymple terms this river Tawarran, inhabited by the Kadýan; populous and abounding with goats.

The name Kawalan was given by an intelligent fisherman, but Tawar, indicating fresh water, is probably the correct prefix.

**Suláman River.**—At 2 miles beyond the Tawálan is the mouth of the Suláman. This appears to be a spacious river, running as far as the eye could trace, in a broad sheet inland. The stream is rapid, and the depth at low water about 6 feet on the bar. Immediately within it increases to 3 fathoms, the channel apparently deepening on the southern bank. Numerous lines of fishing weirs appeared to extend out from the banks, but the natives were not inclined to communicate, possibly owing to the boats having chased two supposed pirates into it the same morning.

**The Coast** from Suláman river trends N.E.  $7\frac{1}{2}$  miles to cape Ambong and is tolerably bold-to. Between this cape and the entrance to port Ambong there are several patches of rock, but mostly above water. Sailing vessels should not approach the land in this vicinity into a less depth than 8 fathoms, or they will lose the wind.

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## CHAPTER VII.

## NORTH-WEST COAST OF BORNEO.

## AMBONG BAY TO SAMPANMANGIO POINT AND MALLUDU BAY.

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VARIATION  $1^{\circ} 20'$  East, in 1879.

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**AMBONG BAY.**—The port of Ambong, approached from the northward, may always be recognized by the peculiar projection of high peaks, as it were, into the sea. On the east will be noticed the island of Usukan showing as a black bushy cone; the mountains near it on the main, exhibiting at the same time smooth yellowish green rounded summits, their bases easterly, falling into apparently level land. In the depth will be seen the high ranges skirting the bottom of the port of Ambong, and if sufficiently clear the blue tinted mountain of Kini Balu, 13,698 feet high, in the distance. On the south the Ambong range, clothed with trees from base to summit, will stand in the foreground sloping off gradually towards the Suláman river, where the high ranges cease, excepting 10 or 15 miles in the interior.\*

A shoal a quarter of a mile in extent, with 15 to 18 feet water, lies with its outer part bearing N.  $\frac{1}{2}$  W., distant  $5\frac{1}{2}$  cables from cape Ambong; at 3 cables north-eastward of this shoal is another of nearly the same extent, but having only 12 feet water in some parts; from a depth of 12 feet near its south-west end, cape Ambong bears S. by W.  $\frac{3}{4}$  W., distant nearly a mile, and Perunjuk point S.E.  $\frac{3}{4}$  E., distant over a mile.

**Supplies.**—Bullocks, goats, fowls, eggs, &c. can be purchased in Ambong at moderate prices. Beeswax, pepper, camphor, birds' nests, and Bornean produce, were freely brought down to trade.

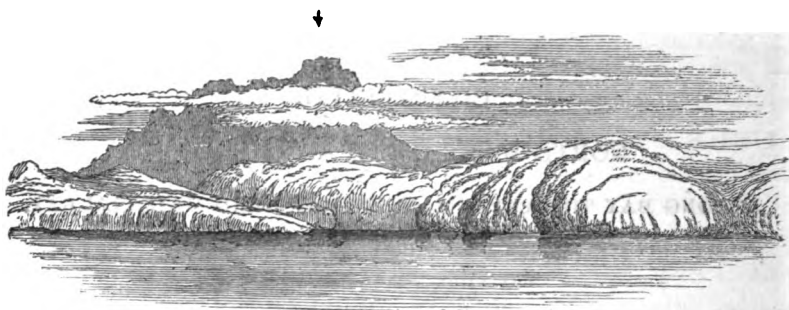
There are two positions for watering. One immediately to the northward and opposite to Ambong town; the other, and the most convenient, (if previously cleared above its run) is at the beach north-eastward of the anchorage. The quantity depends much on the season.

**Directions.**—Vessels bound to Ambong bay from the northward

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\* See Admiralty charts of Borneo, N.W. coast, sheets 8, 9; Nos. 2,111, 2,112; scales  $m$  = half an inch: and plan of Ambong bay, No. 1,778; scale,  $m$  = 4 inches.

with Kini Balu visible, should bring it to bear S.E. and steer for it, which will lead in on the deepest line of soundings.



Kini Balu, S.E., as viewed from the fairway.

There is no danger in approaching from the westward (with a strong leading wind or under steam), and passing between the 15 feet shoal and cape Ambong, except the shoal extending one cable north from the cape.

After passing cape Ambong at a distance of 2 cables, steer for Perunjuk point, and a berth may be taken in 6 fathoms, about 2 cables S.E. of it, with the eastern house of Ambong beach open of Telouk point.

Vessels passing north of the 12 feet shoal should keep Usukan open of Sak point bearing N.E.  $\frac{1}{2}$  N., or when objects can be clearly seen the yellow island, Jaga brought immediately under the highest outer cone, mount Robertson, bearing N.E. by E.  $\frac{1}{2}$  E., may be preferred. On this bearing not less than 11 fathoms will be found until the shoals are passed, and Perunjuk point bears S.E.

Ambong beach, 3 miles distant, will then be clearly seen, and when its western extreme is about to shut in with Perunjuk point, shape a course, immediately for the latter. Do not decrease the depth to less than 10 fathoms, until the western town bluff is shut in. Steer in, on this line, giving Perunjuk point a clear berth of 2 cables, anchoring as before directed.

In fine weather, by a careful look-out from aloft, the shoals will be clearly visible.

The anchorage alluded to, close to Perunjuk point, has peculiar preference for quitting the port, as if farther in before way could be gained not more than half a mile stretch would be available before being compelled to tack. The nearer, therefore, having due regard to squalls off shore after hot weather, the vessel anchors to Perunjuk point, the more advantageous for the longer reach out.

Vessels not intending to remain more than 24 hours, will find good anchorage in Tangah bay.

**Sak Point.**—Quitting Ambong bound north-easterly, Jaga, a very



prominent yellow sandstone cliffy island, may be passed within a cable ; but within the depth of 13 fathoms north of Soundal point there is reason to believe that dangerous rocks near the surface are yet undiscovered ; a rock, awash at low tides and surrounded by a coral bank, lies W.  $\frac{3}{4}$  S. of Sak point, but as there are no muddy rivers discharging themselves hereabouts, "lead and look-out" afford timely warning.

**USUKAN BAY**, situated about 3 miles northward of Ambong bay, affords safe anchorage, has an excellent watering-place in its bight, and is the only convenient spot for communicating with Abai river.

**Directions.**—Passing the rock awash off Sak point, the clearing marks for which are Jaga island open of Soundal point, and the second head on the southern side of Usukan bay open, steer, or work for Slime rock, which may be approached to a cable on the south-west side, and anchor in 10 fathoms, with the apex of the rock bearing N.W. A vessel will then lie secure from swell at  $1\frac{1}{2}$  miles from the watering place in the depth of the bay.

**Slime Rock**, dry at low water, is connected with Usukan island by a ridge under water, and although H.M.S. *Somarang* passed through that channel in 4 fathoms, having 7 fathoms before and after, still on a more careful examination it cannot be deemed safe being very narrow and difficult, with depths under 3 fathoms in some parts.

**Water.**—At the period of drought the springs near Ambong were nearly dry, and, therefore, the water procured at Usukan bay was slightly tinged, as if stagnant ; but, from examination of the interior, we were satisfied that, in ordinary seasons, the stream would flow freely into the sea, and the aspect of the beach fully warranted such a conclusion. Similar marks were noticed in other parts of the bay, at which traces of fresh water were found. As the rivulets at Ambong afforded but little, and the detention of more than two days may be involved, it is important to know that here, in safe anchorage, and not incommoded by natives, watering can be expeditiously accomplished.

**USUKAN ISLAND**, fronting the Abai river entrance, is a prominent feature on the coast, standing out clear from the land, and almost a warning for danger when not shut in. It is high, conical, well covered with timber, and at times of extreme low tides, may be a peninsula ; the least water covering the sandy neck at the period visited was one foot, but any "fresh," in the rainy season, would probably convert this into a connecting sand-bank in a few hours, the last drain of ebb from the Abai river setting to the north-east.

**Abai River** should be entered by boats from the channel south-east of

Usukan, and at the first quarter flood, as the entrance by the north, although deeper, is troubled by rollers.

This was formerly the port of Abai, the principal rendezvous of the Illañon pirates, but since they have selected Tampassuk, as better protected by the Sultan, the importance of Abai has fallen. Nevertheless, when the petty rulers of these positions fairly view their interests in a mercantile point, Abai must again resume its importance.

The natives are peaceable, and will furnish bullocks, vegetables, and refreshments, but not so reasonable as at Ambong.

Abai port is open by its north-eastern entrance to vessels drawing 9 feet at low, and 12 to 14 feet at high water, the bottom within is hard sand, and, unless vessels pass into the river, where 3 and 4 fathoms, mud, will be found, they are endangered by the swell and rollers, which would cause them to strike heavily and bilge. They must not therefore calculate on anchoring in the outer harbour.

As the tide depends in a great measure on the surf prevailing along Tampassuk beach, it may be reckoned dangerous at any time to risk the detention of vessels drawing 6 feet in Abai outer harbour.

No villages were observed within the river, and the guides asserted that they were inland, and only to be approached by paths through the mangrove.

**A DANGEROUS PATCH**, on which the sea breaks, lies North  $1\frac{1}{2}$  miles from the west end of Usukan island, and has three pinnacles awash at low-water springs. The marks for it are the points of Abai port apparently touching, or the points westerly of Usukan bay and peak of Slime rock in line. Abai port open of Usukan leads to the eastward. The channel within this patch is safe and to be preferred.

**Tampassuk River.**—The beach from Abai river to the entrance of Tampassuk river, a distance of about 3 miles, is nearly straight, sandy, and from the very shelving nature of the whole extent of coast up to the Ant islands, constantly subject to heavy rollers, rendering landing dangerous, if not impracticable. The 14-fathoms line extends far to seaward, and although only two patches have as yet been discovered by the sea breaking over them, it is necessary to caution vessels, unless bound to Tampassuk, not to approach the coast to less than that depth, or to open Usukan island of the land westerly.

The entrance to Tampassuk river is barred by a sand-bank, over which at high water there is probably 12 feet, but at low-water springs, not more than 6 feet. Owing to the strength of the fresh water forcing its passage over the bar (in November 1844), it was found difficult to enter the stream opposed to the swell, which produced very unpleasant curls and frequently broke; and the fresh water so overpowered the salt water and ran on its

surface, that about a quarter of a mile off shore in 3 fathoms, it was discoloured by the river mud. Immediately within the river the water deepens to 3 or 4 fathoms, which we were informed continues up to the town.

From Tampassuk river to the extremity of the sandy beach eastward, nothing worthy of notice occurs, but there the sand terminates, forming the mouth of another river, name unknown. The entrance appeared to be studded with rocks projecting from the cliffs of the opposite shore, and rollers prevented ingress. As an Illañon house appeared on the sandy side, it is probable that the prahus are taken in, as at Tampassuk, at high water. Thence, to and around the Ant islands, the shore is studded by reefs composed of dark basalt incrustated with corallines.

**CAUTION.**—It is necessary at all times to be on the guard when near the Illañon pirates which frequent Tampassuk. They are well armed, inclined to be insolent, and are so sudden in their movements, that they may execute great mischief, even slaughter, and escape before they can be overtaken or punished. Although this remark may not now apply to this part of Borneo, still wherever they are fallen in with, the utmost caution is requisite.

**THREE-FEET ROCK** on which the sea breaks, is awash at low water springs, and lies 3 miles from the shore of Tampassuk bay, with the Outer Ant island bearing N.E. by E.  $\frac{3}{4}$  E.  $4\frac{1}{2}$  miles. The line of direction for it is, Usukan island clear of the western land beyond; if the objects overlap, it will lead clear outside.

This danger is surrounded by deep water, and shoals suddenly from 14 to 2 fathoms. In this region the 20-fathoms limit should be preserved during night.

**Ant Islands.**—From Tampassuk river the sandy beach trends N.E.  $\frac{1}{4}$  E.  $9\frac{1}{4}$  miles to Kranga point, close to which lie the Ant islands, consisting of two small islands with rocks above and below water extending about two-thirds of a mile north-westward. A third of a mile outside these is a detached mass of small islets and rocks, named Ant rocks; the outer part of which is nearly  $1\frac{1}{2}$  miles distant from Kranga point in a N.W. direction.

**BISA ISLAND, or BLACK PENINSULA,** situated 8 miles north-east from Ant islands is high, composed of black basalt crowned by trees, and connected with the main by a very narrow isthmus over which boats may be hauled. The shores on both sides are rocky, but tolerably protected from the swell. The coast between Ant islands and Bisa island is thickly studded with dangers, which about a mile to the north-eastward of Gasap point extend a mile from the shore: landing is very difficult.

**MANTANANI ISLANDS** situated 18 miles to the northward of Usukan, and about 12 miles W. by N. from Bisa island, consist of two low islands, and one tolerably high, named Nob island.\*

The western islet is apparently an upheaved coralline mass, the eastern also is similar, but tailed south-easterly by fine coral sand. The *Samarang* found good anchorage within half a mile of the reef at the south angle on the eastern island, having Nob island open; the landing easy. The channel between Nob and western island is open, but no vessel should be induced to pass through. There is no inducement, beyond wooding, for any vessels to touch at this island. It is much frequented by the pirates, and from its off-lying position, commanding an extensive in-shore as well as off-shore view, most convenient for watching for prey.

**Off-lying Shoals.**—The Admiralty chart of the north-west coast of Borneo, sheet No. 9, exhibits, in faint dotted outline, several shoal patches which have been taken from the old charts. Over most of these patches the least water shown is 7 fathoms, but upon one of them there appears to be as little as 5 fathoms. There is reason to believe that many shoal patches may exist in this neighbourhood; H.M.S. *Rifleman*, when sounding between the South Furious shoals and Labuan, passed over a bank at night, lying S.W. by W. 17 miles from Nob island of the Mantanani group. Possibly this may be a dangerous bank, for passing over it slowly, very irregular soundings and as little as 4 fathoms water, were obtained.

Commander George Robinson, of H.M.S. *Rinaldo*, 1872, also reports, that during the passage from Labuan to Manilla, when about 21 miles from the coast of Borneo, the leadsman suddenly got soundings in 7 fathoms decreasing to 5 fathoms, the bottom being distinctly visible, and discoloured water seen from the masthead to the northward.

From this shoal water the west extreme of Gaya island bore S.  $\frac{1}{2}$  E., and the mountain of Kini Balu S.E. by E.  $\frac{1}{2}$  E., the depth of 5 fathoms being in latitude  $6^{\circ} 26' N.$ , and longitude  $115^{\circ} 56' E.$

**St. Joseph Rock**, on which the French barque *St. Joseph* (drawing 10 feet) struck in 1877, is said to lie in the vicinity of the 4-fathom patch, passed over by the *Rifleman* in lat  $6^{\circ} 33' N.$ , long.  $116^{\circ} 5' E.$ , or about 18 miles N.W. from cape Ambong. At the time of the vessel striking Kini Balu mountain bore S.E., and the estimated distance from the nearest point of land was 15 or 17 miles; immediately afterwards a depth of  $4\frac{1}{2}$  fathoms was obtained.

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\* The north-west horn of the eastern island is equally high with Nob island, and, the western island is about two-thirds as high. Mr. Russell, Master H.M.S. *Renard*, 1862.

**South Furious Shoals**, a group of coral patches lying a few miles to the north-westward of the Mantanani islands, were discovered in August 1859 by H.M.S. *Furious*, and examined, in 1863, by the *Rifleman*, which vessel anchored upon a small coral bank, with 7 fathoms least water, barely half a mile in extent, N.N.W.  $\frac{1}{4}$  W. nearly 7 miles from the western extreme of Mantanani islands in lat.  $6^{\circ} 48\frac{1}{2}'$  N., long.  $116^{\circ} 14\frac{3}{4}'$  E.

About 2 miles S.S.W. of the last-mentioned patch is another of 7 fathoms, about a mile in extent westward and south-westward of which are other and more extensive banks, the limits of these banks were not determined. The least water found upon South Furious shoals was 7 fathoms, and the soundings were very irregular.

At about 5 miles N.N.W. from the western extreme of the Mantanani islands is a small patch of 6 fathoms; and N. by W.  $\frac{1}{2}$  W.  $3\frac{1}{2}$  miles, there is a depth of 10 fathoms.

**North Furious Shoals** are three coral patches lying about 20 miles northward of the Mantanani islands. These were also examined in the *Rifleman*, and from the vessel's position at anchor in 11 fathoms in lat.  $7^{\circ} 3' 19''$  N., long.  $116^{\circ} 18' 15''$  E., Nob island, of the Mantanani group, bore S.  $\frac{2}{3}$  E., and Banquey peak E. by N.  $\frac{3}{4}$  N. These shoals extend N.W. by N. and S.E. by S. nearly 2 miles, and the least water upon them is 7 fathoms. The soundings around about are very irregular.

**Barton Rock** appeared on former charts as awash in lat.  $6^{\circ} 52'$  N., long.  $116^{\circ} 19\frac{3}{4}'$  E.  $9\frac{1}{2}$  miles North of the Mantanani Islands. The *Rifleman* passed over this position, without finding the rock; 28 fathoms being the least water obtained, but circumstances did not allow of a farther search.

**White Rocks** (Batu Putih), situated 3 miles N.N.E. from Bisa island, and 2 miles from the shore, consist of two rocks surrounded by a reef extending  $2\frac{1}{2}$  miles in a N. by E.  $\frac{1}{3}$  E. direction, and nearly a mile in breadth. On the northern part of this reef are several rocks above and below water, named White Rock reef.

The largest white rock is in lat.  $6^{\circ} 42'$  N., and long.  $116^{\circ} 35' 52''$  E. Within the reef, good anchorage will be found in depths varying from 8 to 12 fathoms. Two coral patches, well marked by islets, lie S.E. by E.  $\frac{1}{4}$  E. and E. by S., distant respectively  $1\frac{1}{2}$  and  $1\frac{3}{4}$  miles from the largest White rock. The latter patch is off the entrance of a river dry at low water, but within which were noticed two prahus (apparently Illañon). At  $1\frac{1}{2}$  miles S. by W. from this river, is the mouth of another river; and N.N.E.  $\frac{3}{4}$  E., the same distance, there is another river which may be entered by boats, but from the examination it appeared to be merely a salt-water estuary.

These rivers or estuaries, the resort or resting places of pirates (or

possibly Bajow fishermen), are not safe to enter, except at high water. The principal river, which for the sake of distinction obtained the name of Pirate river (the supposed Illaions being then within), has a remarkable conical rock, named Beehive, off its mouth, and a flatter rock, about half a mile south-westward of it.

**A Shoal** with 4 fathoms water and 10 to 12 fathoms close around, lies  $4\frac{1}{2}$  miles North from White rock, 6 miles S.  $\frac{1}{2}$  W. from the outer Batomande, and  $1\frac{3}{4}$  miles W. by S.  $\frac{3}{4}$  S. from the nearest rocky bluff ; (Ganda head) : this shoal was not thoroughly examined, and its vicinity should be avoided as shoaler water may exist.

**Batomande Rock**, composed of yellow sandstone, 40 feet high, lies N.  $\frac{1}{2}$  E.  $10\frac{1}{2}$  miles from White rock W. by N.  $\frac{1}{2}$  N., 2 miles from Agal point, with which it is connected by a dangerous reef, having an opening immediately within the rock. This opening is deep, but too dangerous to be attempted without a pilot. The rocks in this vicinity, which are basaltic, rise so suddenly that the lead will not afford timely notice of danger. Batomande rock is one of the astronomical positions of this coast, and is situated in lat.  $6^{\circ} 52' 42''$  N., long.  $116^{\circ} 36' 24''$  E., or  $7^{\circ} 36'$  W. of Balambangan.

About S.E. 4 miles from Batomande rock is the entrance to Fisherman creek, studded with dangers, and affording no shelter except for boats.

**The Coast.**—Agal point (Tanjong Agal Agal), derives its name from a species of fucus which is collected on its rocky ledges by the fishermen for sale, similar to birds' nest and trepang.

In proceeding to the northward and eastward, a distance of 3 miles from the shore should be observed, the safe course from 10 fathoms off Batomande rock to Kalampunian island being N.E.  $\frac{3}{4}$  N. 14 miles.

The space within this line is only safe for boats. E.N.E. little more than a mile from Tanjong Agal, is an islet, barred by a heavy bank of sand. It appears to be about 6 feet above high-water level, the water within was salt, probably thrown in by heavy rollers, and concentrated by evaporation. The beech exhibited marks of a canoe recently hauled in, by which we are justified in inferring that it is used for navigation. As marks of the crocodile were noticed, it is probably fresh further up. This river may be found by its being immediately to the southward of Casuarinas bluff; the rocks near the mouth of this river are numerous, and landing hazardous.

An unimportant river, navigable for boats at high water, has its entrance on the sandy beech immediately in front of a white cliff, N.E. by E.  $\frac{3}{4}$  E. 3 miles from Agal point.

The next river is about 3 miles northward of the latter, and its entrance

appears to lie at the southern termination of a line of tall casuarinas. The rollers were heavy, the coast very shallow for some distance off shore, and a reef appeared to lie off the mouth of this river.

**Katiga Point** is a black rocky promontory, composed of compact basalt, situated N.E.  $\frac{1}{4}$  E. 8 miles from the Batomande rock. The consideration, that wherever basaltic rocks occur above the surface others may be suspected in their vicinity beneath, should deter any vessels from making too bold with these shores.

A stream flows out immediately northward of Katiga point, but it is barred to boats, some distance seaward, by a long sand flat.

In several places between Katiga point and Kalampunian island fresh water oozes over the sandstone formations. Traces of cattle were noticed, but no traces of human beings were observed during several days' examination of this part of Borneo.

**SAMPANMANGIO POINT**, the north-west extreme of Borneo and the western point of Maludu bay, situated about  $5\frac{1}{2}$  miles north of Katiga point, is readily distinguished by the tall casuarinas which rise from its grassy bluff, and by the island of Kalampunian off its extremity.

**Water.**—It is probable, in favourable seasons, that water may be obtained in the western bay, immediately south of Sampanmangio point, where the sandy beach succeeds the cliff termination and the level or marshy ground commences. This is also the favourite resort of deer, wild hogs, &c.

**Kalampunian Island** lies one mile north of Sampanmangio point, is of sandstone formation, similar to the nearest bluff of Sampanmangio, and rises abruptly, from a flat bed, to the height of 40 feet. The flat is of considerable extent, and divides into detached reefs, which are incrustated by corallines. There is a safe channel nearly half a mile wide between it and the main, having depths of 7 and 8 fathoms. The dangers are visible and are easily avoided by a careful look-out from aloft.

**Malludu Bay**, at the head of which lies Malludu river and village has not been examined, and must be navigated with great caution. This bay appears to be about 20 miles deep in a southerly direction, and 17 miles wide at its entrance, in which are depths of 13 to 19 fathoms, decreasing gradually towards the head of the bay, where anchorage may be obtained in 7 fathoms, with Woody island bearing N.W. by W.  $\frac{1}{4}$  W., and Pirate point N.  $\frac{3}{4}$  E.\*

**Tides.**—It is high water, full and change, in Malludu bay, at 10 h. 30 m.; springs rise 6 to 8 feet.

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\* See Admiralty plan of Malludu bay, No. 946; scale,  $m = 0.5$  of an inch.

## CHAPTER VIII.

## NORTH PART OF BORNEO TO SOUTH PART OF PALAWAN.

## BALÁBAC STRAIT AND ADJACENT ISLANDS.

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 VARIATION  $1^{\circ} 20'$  East, in 1879.
 

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Between the north part of Borneo and the south part of Palawan are several small islands, of which Balambárgan, Banguay and Mallawallé, with many islets and rocks, form the southern group. Northward of this group is Balábac strait, which connects the China, and Sulu or Mindoro, seas. The elevated island of Balábac, the northern limit of this strait, with the smaller islands of Mantangoule, Bancálan, Bugsuk, Pandannan and others form the northern group.\*

**BALAMBÁRGAN ISLAND**, situated 11 miles N.E. by N. from Sampanmangio point, is of irregular shape,  $13\frac{1}{4}$  miles long, in a north-east and south-west direction, and its extreme breadth about 6 miles. The southern portion of this island presents a range of hills, the highest being 440 feet; there are also other elevations, one of which, Thumb peak, 314 feet high, near the south-west extreme of the island, is conspicuous; these elevations are terminated on the coast line by abrupt cliffs. The northern portion of the island is flat, but thickly covered with high trees. On the east side of Balambárgan island are two inlets known as North and South harbours; and on an inlet near the south-east extreme of the peninsula forming the south side of South harbour, observations were obtained by Sir Edward Belcher, as the chief eastern meridian for his survey of the north coast of Borneo.†

"The composition of these elevations varies between limestone, basalt, trap, and sandstone. The eastern spur dividing the harbours being, where met with, of sandstone; that composing the southern side of the rocky interior of the southern harbour, is of white crystallized limestone approaching to marble. All the rocks exhibit traces of violent convulsion, presenting fragments loosely piled, as remarked on several other islands on the north coast, but towering above all, two

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\* See Admiralty charts:—Palawan island, No. 967, scale,  $m = 0.1$  inch; and Balábac strait, and channels between Borneo and Palawan, No. 948, scale,  $m = 0.5$  inch.

† See Admiralty plans of North and South harbours, on sheet No. 966; scale,  $m = 3.2$  inches.



precipitous peaks seem to offer the masses from whence these portions have been shaken.

"These observations have a direct bearing on the water, which, in the South harbour, is noticed oozing from a reddish adhesive clay surrounding the bases of the elevations described.

"Both harbours afford good water, but the purest was found at the southern one.

"The southern almost detached peninsula, which was denuded, and the summit levelled for the observatory, was found to be composed of loose fragments of limestone, and the coast and off-lying islets also were of sandstone of various degrees of hardness, the beach furnishing good silicious sand for the decks. The extreme south-west island, however, presents on its south-west face a dark compact basalt."\*

From Kalutan point the south extreme of Balambárgan island, several islets and rocks extend three quarters of a mile in a south easterly direction. At half a mile eastward of these islets and rocks is a detached coral patch with 3 fathoms water, from which the south point of Balambárgan bears W. by N.  $\frac{3}{4}$  N., distant one mile, and Observatory point N.E.  $\frac{1}{2}$  N., nearly  $1\frac{1}{4}$  miles. About three quarters of a mile north-west of Kalutan point and half a mile from the shore, is the small round island of Kalutan, 278 feet high, having a reef projecting nearly half a mile from its west side.

Between Kalutan island, and point Buttun at  $5\frac{1}{4}$  miles north of it, the reef extends nearly three quarters of a mile from the shore, and the large bay north-east of point Buttun has less than 3 fathoms water, extending nearly  $1\frac{1}{2}$  miles from the shore; at 2 miles from the north-west part of the island lies the Siagut shoal, a detached coral bank,  $1\frac{1}{2}$  miles in length, with less than 6 feet water over some parts of it; by keeping in depths not less than 14 or 13 fathoms all these dangers will be avoided.

Reefs and shoals extend more than three-quarters of a mile from Siagut point, the north extreme of Balambárgan island, and a 3-fathom patch lies N.N.W., nearly  $1\frac{1}{4}$  miles from it: vessels should therefore when rounding Siagut point give it a berth of 2 miles, or not come into less than 9 or 8 fathoms water.

The whole of the east coast of Balambárgan is fronted by coral reef, outside which are detached dry patches here and there, but the 3-fathom edge embracing these is, for the most part, distant half a mile from the shore. A mile and a half south-eastward of Siagut point, and separated from the shore reef by a narrow passage 6 fathoms deep, lies a coral shoal, more than half a mile in diameter, having less than 6 feet water over some

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\* Sir E. Belcher.

parts of it; eastward of this danger, in the channel between it and the extensive reef surrounding Tiga Islet, is a small shoal of  $3\frac{1}{2}$  and another of  $2\frac{1}{2}$  fathoms, caution is therefore necessary when passing through that channel.

The shoals eastward of Observatory head, and along the south-east coast, are not easily discovered unless the sun be shining on the back of the observer. These shoals will then exhibit a pale green tint, the deeper water being clearly defined by a deep blue.

**Tiga Islet**, situated in the northern entrance of Banguay west channel, is low and covered with trees, with a sand cay close to the eastward of it; the islet is a little over half a mile long, a quarter of a mile broad, and surrounded by reefs extending more than a mile in a northerly, and about three-quarters of a mile in other directions; it must therefore be approached with caution.

**Directions for South Harbour.**—To enter this harbour requires close attention to the following directions, as well as the customary warning of “lead and look out”:—First, the Cone, the outer islet off Kalutan point, open of the islets off Observatory peninsula W.S.W., clears the shoals between Round island and Raha reef, and on that bearing, if the anchor be let go at the moment the harbour heads open N.W., the vessel will be in 13 fathoms, sufficiently clear of danger.

If standing beyond with these marks on, look out for the southern of the Raha rocks, coming on with the inner point, bearing N.W.  $\frac{1}{2}$  W.; these cross lines clearly guard the Eastern patch, on which the water decreases suddenly from 10 fathoms to 6 feet, and even to 3 feet. Although from an intimate knowledge of the dangers, a pilot might take a vessel in safely, still the seaman wishing to warp or steam in, can do so by attending to the following information:—

Having steamed to, or being at, the cross marks first mentioned, steer a North course, edging the Raha reef the rounding point of which can easily be seen from aloft, or by breakers on the reef edge, and when Round island is shut in with Raha point, the vessel may anchor in safety off the watering place in 7 fathoms.

**Water** will be found at a green patch of grassy land cleared from trees, about a quarter of a mile within Raha point. The reef prevents access until half tide; but by damming the stream with a perforated tub or cask and the surrounding clay, and screwing the hose into the bung hole, the water will flow clean to the boats, without the aid of the engine. In watering the *Samarang*, the hoses were conducted (stopped along a hawser stretched over sheers) to the reef edge, thus preventing detention by low water, and further protecting the hoses from injury.

**Directions for North Harbour.**—The North harbour, or Looe

Barábok Barábok (a Bajow name), offers greater convenience for anchorage than the South harbour, and is of much easier approach, the shoals being better defined.

To clear the shoals off Sapiroak point, do not lose sight of the southern point of Balambárgan, or mask it by the islets off Observatory point, on which line the Half Channel patch lies, breaking at times, and having 3 feet at low water.

The Banguey island shore is safe; work upon that coast until Battang point bears about W. by N. Enter the harbour on a West course, half way between the northern reef awash and Battang point, looking out to avoid a 9 feet knoll, lying half a mile from the shore, just within Battang point. A shoal awash lies about  $3\frac{1}{2}$  cables north-west of this knoll, and anchorage may be obtained in 10 fathoms, with its centre in line with the trees of Battang point. The south reef is also awash, and behind it (with a safe channel out S. by E. grazing the reef) the *Samarang* anchored.

**Water.**—It was on the southern point of North harbour that the English establishment (abandoned in 1803) was situated. The spot will still easily be detected, by the cleared and firm ground immediately within the bend of Sapiroak point, also by fragments of bricks scattered about the grassy plot. Two streams flow into the sea, one on each side of the ruins. The westernmost is to be preferred, and by a little attention, clearing it of dead leaves and other obstructions, will soon flow in a clear stream, and, even in the dry season, furnish about 15 tons during the day.

On the north side of this harbour, and continuously up to the northern extreme of Balambárgan, fresh water may be found in pools inland, and at some positions north of Battang point it forces its passage into the sea. It is sweet, but discoloured by dead leaves, as well as the peaty soil through which it percolates, rendering its salubrity doubtful.

The water at the site of the old establishment is derived from a rocky bed, and infinitely to be preferred.

Fuel may be obtained at any part of this island, and is similar in quality to the woods of Borneo grown on hard soil.

**BANGUEY ISLAND**, the west extreme of which lies  $2\frac{1}{4}$  miles east of Balambárgan, is  $19\frac{1}{2}$  miles long in a north-east and south-west direction, and about 13 miles broad. The island is surrounded by a fringed reef, the south coast being faced by small islands, having deep water channels between, and large concealed spaces behind, which formerly served as the principal rendezvous and hiding places for the Llanum pirate prow, when engaged upon marauding expeditions on the coasts of Borneo and Palawan, and are not probably even now altogether unused for that purpose; these small islands form part of the northern limit, and are

included in the description of Banguay South channel. The west coast is included in the description of Banguay West channel, and the north coast in that of Balábac strait. Off-lying for several miles the north-east and east coasts of Banguay are numerous islands, islets, and dangers, some of which will be included in the description of Banguay South channel.

There are several ranges, also some detached hills, on Banguay; the highest, Banguay peak, 1,876 feet high, is at the north-west end of the island, and shews up as a very conspicuous object for more than 30 miles around. Viewed on a north-westerly, or opposite line of bearing, the apex appears as a sharp nipple, but as this line of bearing is departed from, the nipple shape becomes less apparent, and a shoulder comes into sight; this last, being but little less elevated than the peak, causes the crest of the hill to appear rounded when viewed from long distances. From the peak a long spur slopes in a south-westerly direction to the west coast, and a range of hills extends to the eastward for a distance of 6 miles, East hill at the extreme of this range, being elevated 1,076 feet; thence some smaller ranges lie in a northerly direction, and terminate near the coast in North hill, 742 feet high. About  $1\frac{1}{4}$  miles south-eastward of Banguay peak is a conspicuous hill 1,480 feet high, from which a lower range extends 2 or 3 miles to the southward, where it curves in a south-easterly direction.

#### BANGUEY WEST CHANNEL.

Banguay West channel, between Balambárgan and Banguay, is about 11 miles wide at its south entrance with 20 to 24 fathoms water, decreasing gradually to 9 and 6 fathoms in the north entrance, which is about 5 miles wide; but for vessels of heavy draught, it is contracted to about half a mile by Rifleman rock and the reefs extending from Tiga islet.

The dangers off the south-east and east coasts of Balambárgan, as well as those encircling Tiga islet, which limit the channel to the westward, have already been described; the following is a description of the south-west, west, and north-west coasts of Banguay, which forms the eastern boundary of the channel.

**Molleangan island**, 446 feet high, situated  $1\frac{1}{4}$  miles south-westward of the south point of Banguay, is  $1\frac{1}{4}$  miles long east and west and three-quarters of a mile broad, with rocks and shoals extending three-quarters of a mile in a north-west, west, and south-westerly direction; the south-east and north-east sides of this island are steep to. Several shoals with rocks above and below water lie nearly midway between Molleangan and Banguay. At one mile south-west of Molleangan, lies Little Molleangan island, from which dangers extend a third of a mile eastward, and three-quarters of a mile westward, with 13 to 17 fathoms close to.

**West and N.W. Coasts of Banguey.**—The dangers off the west coast of Banguey either show distinctly, or the lead warns sufficiently in less than 16 fathoms, or within  $1\frac{1}{2}$  miles of the shore. The shoals off this coast therefore require but moderate caution, with the exception of those off-lying the southern extremity.

Manyangit point, the north-west extreme of Banguey, can be approached to within a quarter of a mile, the shore reef extending but a short distance from it; but immediately to the northward of this point the coast recedes to the eastward, the shore reef curving round—convex to seaward—to the north-eastward, until with Banguey peak bearing south it nears the shore within 2 cables; this peculiarity must be borne in mind, especially when approaching Manyangit point from Balábac strait. About  $4\frac{1}{2}$  miles N.E. by E.  $\frac{1}{4}$  E., from Manyangit point, upon a dry patch at the edge of the shore reef, is a small islet, which is difficult to recognize from a distance. The north-west coast terminates at Samarang point, three-quarters of a mile W.N.W. of which is the outer edge of a patch of dry coral, having on it a sand cay, which bears N.E.  $\frac{3}{4}$  E., 6 miles from Manyangit point: between the islet and sand cay is another similar patch of dry reef, so that this part of Banguey must be neared with caution.

**Coral shoals.**—A mile westward of the small islet, just mentioned, lie two small coral shoals, occupying a space half a mile in extent, the north-eastern having  $2\frac{1}{2}$  fathoms water, and the south-western 3 fathoms; from the north-eastern shoal Manyangit point bears S.W.-westerly; Banguey peak S. by W.  $\frac{1}{2}$  W.; and Samarang point E. by N.  $\frac{3}{4}$  N. The channel between these shoals and the shore dangers is clear, with depths of 6 and 7 fathoms.

**Rifleman rock**, a small coral patch with 9 to 15 feet water, and 5 and 6 fathoms close to, lies in the fairway between the shoals just described and those extending south-eastward from Tiga islet, distant  $1\frac{1}{2}$  miles from the former, and nearly a mile from the latter: from the centre of the rock Manyangit point bears S.S.W., and the south-west end of Tiga islet W.  $\frac{3}{4}$  N. Westward of the rock are 6 and 7 fathoms, but eastward of it the soundings are shoaler and more irregular; S.E. by E., 4 cables from it, there is a depth of  $3\frac{1}{4}$  fathoms. Saparoak and Battang points in line lead eastward of the Rifleman rock and clear of the dangers off the north-west coast of Banguey, but close to the  $3\frac{1}{4}$  fathoms; Manyangit point bearing S.S.W.  $\frac{5}{8}$  W. leads between the  $3\frac{1}{4}$  fathoms and the rock, and bearing S. by W. leads between the rock and Tiga islet shoals.

**Tides.**—It is high water, full and change, in Banguey West channel, at 10 h.; springs rise 6 to 8 feet.

**NORTH and N.E. COASTS of BANGUEY.**—Between Samarang point and the north point of Banguey the coast recedes, forming

two bays, each having a small stream running into it; the points and the sides of the western bay are fringed with coral extending one to 2 cables from the shore, but the head of it is a coral and sand beach: vessels may anchor in the entrance of the bay in 4 fathoms, or further in, if necessary, the soundings decreasing regularly towards the beach. The eastern bay, with the exception of a narrow boat passage, is blocked with coral, upon the outer part of which, fronting the bay, is a small islet.

**North Guhuan** islet stands on the western part of a reef three-quarters of a mile in extent, situated nearly a mile off the north point of Banguay, and  $5\frac{1}{2}$  miles E. by N.  $\frac{3}{8}$  N. from the sand cay off Samarang point.

Westward of North Guhuan there are no off-lying dangers; and the soundings, under a depth of 10 fathoms, decrease regularly towards the shore.

**The Coast** from the north point of Banguay trends E. by S.  $2\frac{1}{2}$  miles, S.E.  $1\frac{1}{4}$  miles, thence sharply to the southward, forming the east coast of the island.

**Off-lying dangers** are numerous, and extend 5 to 6 miles from the north-east part of Banguay. The limits of these dangers, and the greater part of the reefs and shoals in the vicinity of Balábac strait, are depicted on the chart by a pecked line, within which vessels should not pass.

A shoal bank extends from the reef surrounding North Guhuan in an E.  $\frac{3}{4}$  S. direction,  $4\frac{1}{2}$  miles; from its centre a tongue, which partially dries, projects half a mile to the northward, with a depth of 3 fathoms, E. by N., a quarter of a mile from the extreme. Two sand cays, surrounded by reefs, lie at the eastern end of this shoal bank, between which and the shore dangers there are depths of 4 and 5 fathoms.

**Louisa shoal**, composed of coral, with 9 feet water, is three-quarters of a mile long N.W. and S.E., and nearly half a mile broad; from its north extreme North Guhuan bears S. by W.  $\frac{1}{4}$  W., distant  $1\frac{1}{2}$  miles, and from its west extreme Samarang point S.W. by W.  $\frac{1}{4}$  W. nearly 6 miles. Manyangit and Samarang points in line, bearing S.W.  $\frac{3}{4}$  W., lead half a mile outside this danger.

**Maggie reef**, situated E. by N. a little over  $2\frac{1}{2}$  miles from Louisa shoal, is composed of coral a quarter of a mile long, dry at low water, and stands on the northern part of a coral shoal, about 3 miles in circumference, having upon it several rocks, just below water. This reef is about 2 miles from the sand cays, before mentioned; but the channel between the shoals, on which the reef and sand cays stand, is not quite  $1\frac{1}{2}$  miles broad: from the outer edge of Maggie reef shoal North Guhuan bears S.W. by W.  $\frac{1}{2}$  W.  $4\frac{1}{2}$  miles; the same object bearing S.W. by W. leads half a mile north-westward of it; and East Guhuan bearing S.S.E.  $\frac{1}{2}$  E. leads eastward.

**Black Watch rock**, on which the British barque *Black Watch* is reported to have struck, 1878, lies just within the danger line depicted on the chart, 2 miles north of Maggie reef.

From the position of this rock, as given by the master of the *Black Watch*, North Mangsee island is seen open of South Mangsee island, bearing N.  $\frac{3}{4}$  E., and the cay on Banguay Outer north-east reefs, S.E.  $\frac{3}{4}$  E.

From the irregularity of the soundings near this suspected locality it is possible that shallow coral heads may exist.

**The Soundings** eastward of North Guhuan are very irregular under a depth of 10 fathoms; the edge of the bank extending from the shore, and defined by the 10-fathom line, is  $3\frac{1}{4}$  miles distant from North Guhuan, and nearly 2 miles from Louisa shoal; near the edge to the northward of Louisa shoal there are depths of 5 fathoms, with 12 and 13 fathoms a short distance to the southward. Between Louisa shoal and Maggie reef are several  $3\frac{1}{2}$ ,  $4\frac{1}{2}$ , and 5-fathom patches, with 6 to 9 fathoms close around. A small patch of  $5\frac{1}{2}$  fathoms lies on the edge of the bank, with 12 fathoms close to the northward: from this patch North Guhuan bears S.W.  $\frac{1}{2}$  S.; the right extreme of South Mangsee N. by E.  $\frac{1}{4}$  E.; and East Guhuan S.S.E.  $\frac{1}{4}$  E.

**East Guhuan islet**, about a quarter of a mile in extent, stands on the west side of a coral shoal which extends nearly half a mile north-westward, 3 cables north-eastward, and nearly a mile south-eastward from the islet. The north-west part of the shoal mostly dries, but over the north-east part, which is a narrow spit, are 18 feet water. About a mile N.N.W. of East Guhuan islet, lies a 9-foot patch, about 3 cables in extent; and less than 2 cables southward of the islet is a small patch with 9 feet water, and 4 to 5 fathoms close to.

**Banguay Outer N.E. reefs** are a cluster of reefs and shoals separated from Maggie reef, and East Guhuan islet by a channel, three-quarters to  $1\frac{1}{4}$  miles wide, with depths of 7 to 10 fathoms; these reefs are  $3\frac{1}{2}$  miles long in a N.W.  $\frac{1}{2}$  W. and S.E.  $\frac{1}{2}$  S. direction, and a little over a mile broad. A large reef occupies the centre of the cluster, and dries within three-fourths of a mile of each end; upon the north-west extreme of the reef is a sand cay, which is very useful for pointing out the locality of these dangers, which lie 6 miles from the shore. Shoal water extends nearly a mile eastward of the cay, but only a short distance from the west side: close to the edge of these shoals there are 11 or 12 fathoms water.

**Directions for Banguay West channel.**—Sir Edward Belcher advises that vessels bound for the North harbour should keep towards the Banguay coast until they are northward of Half-channel

rock ; this also applies to vessels bound through Banguey West channel to Balábac strait.

All dangers in the vicinity of Molleangan islands, and the south-west part of Banguey will be avoided if a depth of 19 fathoms be preserved, or if Banguey peak be not brought to the northward of N.N.E. ; and when the south-west point of Banguey bears S.E. by E., avoid bringing Manyangit point to the northward of N. by E.  $\frac{1}{4}$  E., which will keep vessels clear of the whole of the dangers fronting the west coast of Banguey. As the hills on this coast abreast Half-channel patch are neared the soundings will decrease to 17 and 14 fathoms.

Being to the northward of Half-channel patch, keep a little towards mid-channel, and steer N.  $\frac{1}{2}$  E. until about a mile past Manyangit point, when it should be brought to bear S. by W., and a N. by E. course, carefully steered (allowing for the tide). When the centre of the highest part of Tiga islet bears W. by N. a vessel of heavy draught should edge more to the eastward, to avoid some 4-fathom patches, the nearest of which lies half a mile north-westward of Rifleman rock.

The channel westward of Rifleman rock is to be preferred, but small vessels may pass safely through any of the channels eastward of it, by carefully attending to the bearings of Manyangit point.

#### BANGUEY SOUTH CHANNEL.

Banguey South channel, leading from the China into the Sulu sea, is somewhat intricate, and requires careful navigation, being for the greater part of its length bounded by dangers. The western entrance, about  $1\frac{3}{4}$  miles wide, lies between Outer shoal, the northernmost of N. W. Borneo dangers and Molleangan islands. The southern limits of the channel are formed by the N.W. and North Borneo dangers ; South channel dangers ; the reefs off the northern part of Mallawallé ; Mallawallé Eastern dangers ; and Fairway shoal. The northern limits by the islands which lie close to, and appear to be part of, the southern shore of Banguey ; Carrington reefs ; and S.E. Banguey dangers.

**N.W. and NORTH BORNEO DANGERS.**—Lying off the north-west and north coasts of Borneo are a number of coral shoals, generally of small extent, some partially dry at low water, whilst others dry entirely, and two are marked by sand cays, which shine brightly in the sunlight. Those dangers only will be described which limit the channels proper for vessels to proceed by ; to describe the others in detail would tend rather to confuse navigators, who can have no inducement to risk the safety of their vessels by venturing amongst them. Small vessels may perhaps, have occasion to venture there when in pursuit of pirates, but



they will be more safely guided by attention to the chart than by any description of these dangers.

**Outer shoal**, the largest of these dangers, forms the south-west limit of Banguey South channel; it is about a mile in extent, with 6 feet least water, and a patch which dries near its eastern side. The north-west end of this shoal has 13 fathoms close to, and from it the apex of Little Molleangan bears N.E.  $\frac{3}{4}$  N.,  $2\frac{1}{2}$  miles; and a small islet close to the north-west point of Borneo, having upon it a white patch which shews like a boat's sail, bears S.E.  $\frac{3}{8}$  S., 5 miles.

A sand cay, on the east side of a coral ledge nearly awash, lies E. by S.  $\frac{1}{4}$  S.,  $2\frac{3}{4}$  miles from the north-east extreme of Outer shoal, and S.E. by S. southerly nearly  $3\frac{1}{4}$  miles from Little Molleangan.

Nearly mid-way between Outer shoal and this sand cay is a small coral patch with only 6 feet water, and 15 to 28 fathoms close around.

Another small sand cay, in the centre of a coral ledge, lies East  $3\frac{3}{4}$  miles from Outer shoal, and S.E.  $\frac{1}{4}$  E.,  $3\frac{3}{4}$  miles from Little Molleangan. These cays are useful as marking the limits of the channel, in the direction of Borneo, and being composed of white coral sand, are very conspicuous.

Nearly 3 miles E.N.E. from the sand cay, last mentioned, is a 2-fathom coral shore, with two ledges which dry, a short distance southward; from this cay, which is the most northerly of North Borneo dangers, Little Molleangan bears W. by N.  $\frac{1}{2}$  N.  $5\frac{3}{4}$  miles, and the apex of Patanunam N.N.W.  $\frac{1}{2}$  W., nearly 4 miles.

About  $1\frac{1}{2}$  miles E.  $\frac{1}{2}$  S. from the 2-fathom shoal is the outer of two coral ledges lying close together; from it Little Molleangan bears W. by N.  $\frac{1}{4}$  N.,  $7\frac{1}{2}$  miles, Patanunam apex N.W.  $\frac{1}{4}$  W., 5 miles, and the highest apex of Mallawallé E.  $\frac{1}{2}$  N., 8 miles. A 3-fathom patch lies 3 cables E.S.E., and a ledge of rocks a little over  $1\frac{1}{2}$  miles in the same direction from these dangers; this ledge, however, should properly be considered one of the dangers off-lying the north-east coast, and affecting the navigation of the channel between Borneo and Mallawallé.

**South channel dangers** comprise five coral shoals which lie nearly midway between the Banguey and Borneo coasts, limiting Banguey South channel to the southward, and Mallawallé channel to the northward. Three of these shoals lie in an E. by N. and W. by S. direction, about half a mile apart: the westernmost is more than half a mile in extent, and dries near the centre; the middle shoal is half the size of the westernmost, and dries near the centre at low water; the easternmost shoal is a strip of coral nearly three-fourths of a mile long, and 2 cables wide, having a rock just under water at its eastern extreme; the fourth a  $2\frac{1}{2}$ -fathom shoal, lies S. by E.  $\frac{1}{4}$  E. 6 cables, and the fifth, a similar shoal, with the same depth of water, N.E. by E.  $\frac{1}{4}$  E.,  $1\frac{1}{2}$  miles, from the rock on the

easternmost shoal of the three first described. Between the different dangers are passages which it is possible for vessels to pass through, but, as this would serve no useful purpose, it is only necessary to consider these shoals as a dangerous group.

**Clearing marks.**—The apex of Molleangan island W.  $\frac{3}{4}$  S. leads north; the same object W.  $\frac{1}{2}$  N. leads south; the south apex of Pagassan island N.  $\frac{1}{4}$  E. leads west; and the islet next the point of Banguay, east of Lampassan, N.  $\frac{1}{4}$  W. leads east of South channel dangers.

**Mallawallé island**, 7 miles distant from the south-east part of Banguay, and the same distance E. by N. from the north extreme of Borneo, is of very irregular shape, 5 miles long in a north-westerly and south-easterly direction, and about 4 miles broad. The island for the most part consists of ranges of hills from 400 to 500 feet high; but one range, towards the north-west end, attains the elevation of 562 feet. Close to the coast, on the west side, is West island, which, with two islets south-eastward of it, appears to be part of Mallawallé; N.W. islet lies a short distance off the north-west end; and North island, low and nearly a mile in length, almost joins the north part of the main island.

A reef which dries at low water encircles Mallawallé and the adjoining islands and islets; the edge of this reef is a little over a third of a mile distant from the south point, and thence continues in a straight line to the north-westward, passing about two cables outside West island; but having reached the north-west point of Mallawallé it curves round and a narrow spit projects more than a mile to the southward, forming a small harbour, with 8 fathoms water in it, where proas, or other small vessels, could easily find anchorage.

From N.W. islet the reef extends half a mile, and more than that distance north-westward of North island; rounding the extreme of that island at a distance of a quarter of a mile, it curves round to the eastward and south-eastward, its distance from the points of the coast varying from half to a quarter of a mile, until abreast the eastern end of the island where it projects a mile to the eastward. At the south end of Mallawallé is an inlet about a mile in depth, with a channel of 4 and 5 fathoms between the dry reefs at its entrance: between this islet and the south and east extremes of the island, reefs extend half a mile from the shore.

A 2-fathom coral patch lies N.N.W.  $\frac{1}{4}$  W., nearly 7 cables from North island, and 5 cables outside the reef encompassing it, and from this patch three narrow strips of reef, dry at low water, extend more than 2 miles to the eastward; the westernmost strip is marked near the middle by a sand cay. Between these dangers and the shore reef is a channel with depths of 10 or 11 fathoms, decreasing to 4 fathoms near the reefs on either side.

Half a mile north-eastward of the east extreme of the encircling reef, is

a conspicuous sand cay, situated near the west end of a detached reef which extends a mile eastward of the cay, and is three-fourths of a mile broad : the channel between this danger and the shore reef is blocked by a 2-fathom coral shoal. About  $1\frac{3}{4}$  miles N. by E. from the east end of Mallawallé and N.N.W.,  $1\frac{1}{4}$  miles from the cay, is a narrow strip of coral, half a mile in length, which dries ; having 12 and 13 fathoms close around ; and S.E.  $\frac{1}{2}$  E.,  $1\frac{1}{4}$  miles from the cay, is another small coral patch, which dries, with depths of 15 fathoms close to.

**Mallawallé channel.**—Dangers extend off 3 or 4 miles from the north-east coast of Borneo, and between these and Mallawallé is a safe channel 3 miles broad ; but a rock lies in the fairway just outside the southern part, which is the limit of the *Rifleman's* survey in that direction, and, probably, many other dangers will be discovered when the survey is extended.

**MALLAWALLÉ EASTERN DANGERS** comprise a large number of detached reefs and shoals which extend 10 or 11 miles in an E.N.E., East, and S.E. direction from Mallawallé. It is only the northern edge of these dangers, bounding the eastern part of Banguay South channel to the southward, which require description, for there can be no object in risking a vessel amongst them. Should occasion arise for taking a vessel through these shoals, it could only be done, with a reasonable chance of safety, by proceeding cautiously, guided by a vigilant look-out from aloft.

About  $2\frac{3}{4}$  miles N.E. by E. from the detached cay off the eastern end of Mallawallé island, is a small coral reef which dries and has depths of 14 and 15 fathoms close around. One third of a mile southward of this reef is a shoal half a mile in extent, with less than 6 feet water over it. A cluster of reefs and shoals, occupying a space  $1\frac{1}{4}$  miles in extent, with 13 fathoms close to on their northern side, lies a mile eastward of the coral reef, just described ; and E. by N.  $\frac{1}{2}$  N.,  $3\frac{1}{2}$  miles from the same danger is a shoal half a mile in length, with only 7 feet water on its northern end. This danger, being always covered, is not so readily seen as the others, and it is important to bear this in mind, as the shoal occupies a prominent position, bordering as it does on the deep water of Banguay South channel.

**The Straggler**, a small coral islet, with trees 20 feet high, is a very useful object for guiding strangers into, and assisting them in navigating the eastern part of Banguay South channel. From it the 7-feet shoal just described lies N.W. by W.  $\frac{1}{4}$  W. nearly  $1\frac{1}{2}$  miles, whilst westward of the islet are several other dangers. The reef surrounding the islet extends  $1\frac{1}{4}$  miles in an E. by N.  $\frac{1}{2}$  N. direction, but only a short

distance in other directions. About  $1\frac{1}{2}$  miles S.E. from the east extreme of the Straggler reef, and E. by S.  $\frac{3}{4}$  S. from the islet is the outer edge of a shoal having in some places less than 6 feet water. This is the north-eastern danger of the Mallawallé group, and half a mile eastward of it is a  $3\frac{1}{4}$  fathom coral patch. Other dangers of the group extend 7 miles further to the southward, which was the limit of the *Rifleman's* survey in a south-east direction from Banguéy.

**Fairway shoal**, at the eastern entrance of South Banguéy channel, is three-quarters of a mile in diameter, with 9 feet least water, and a rock awash near its southern part; its southern extreme lies N.E.  $\frac{1}{4}$  E.,  $2\frac{1}{2}$  miles from the Straggler, but only  $1\frac{1}{2}$  miles N.N.E.  $\frac{1}{2}$  E., from the eastern extreme of Straggler reef, which limits the width of the channel southward of the shoal: the channel northward of the shoal is 3 miles wide. From the eastern part of this shoal the highest part of Mallawallé bears W. by S.  $\frac{1}{2}$  S., 14 miles, and Banguéy peak W.N.W., westerly,  $27\frac{1}{4}$  miles.

**Patanunam island**, three-quarters of a mile eastward of the south-west point of Banguéy, is more than half a mile in extent, and 428 feet high; the summit is a useful object for determining a vessel's position when passing through the channel. The island is fringed by a narrow belt of coral projecting 2 cables from its south-west end, whilst off the north-east end a detached narrow reef extends nearly a mile in that direction.

**Pagassan island**, hilly in character, is about 2 miles in extent, and fringed by a reef which projects 3 cables from the southern part, and a cable farther off lies a rock awash; the island must therefore be approached cautiously.

**Lampassan island**.—Three-quarters of a mile eastward of Pagassan is Lampassan, the southern part of which extends thence  $2\frac{3}{4}$  miles in an E.N.E. direction. This island is also high, and from its southern and eastern points some peculiar spits of coral, dry at low water, project nearly three-quarters of a mile.

**South-east part of Banguéy**.—A short distance eastward of Lampassan a point extends from Banguéy towards the channel, forming one side of a deep inlet, the other side being a peninsula forming the south-east end of Banguéy. A short distance off the point, on the shore reef extending from it, lie two islets, and from these a number of rocks, nearly connected, extend in a S. by W. direction nearly  $1\frac{1}{2}$  miles; from the outer, or southern rock, the east end of Lampassan island bears N. by W.  $\frac{1}{4}$  W.,  $1\frac{1}{4}$  miles. The inlet just mentioned is blocked, and the south-east extreme of Banguéy bordered by coral reefs, outside the edges of which, opposite the mouth of the inlet, lie two large detached patches, the south end of the outermost being a mile from the shore reef.

**CARRINGTON REEFS**, situated about  $2\frac{1}{2}$  miles from the east end of Lampassan, are composed of coral, for the most part dry at low water, 4 miles long in an E. by N. and W. by S. direction, and one mile broad; at 4 cables from the north side of these reefs is a detached shoal of  $2\frac{1}{2}$  fathoms. Between this shoal and the dangers extending from the Banguay shore is a channel three-quarters of a mile wide, but which, as a matter of ordinary navigation, no vessel would require to use. It is however, practically available for small steam vessels, which may afterwards round the Carrington reefs and return into Banguay South channel; or they may proceed into the Sulu sea, either by the narrow and intricate passage between the shore reefs and those surrounding Bancawan and Latoan, or by Bancawan channel, a broader and much less intricate passage separating the Bancawan and South-east Banguay dangers.

The main channel, however, lies between the Carrington reefs and those off the north part of Mallawallé, and this channel only should be used by strangers, taking care not to near the former dangers under a depth of 15 or 13 fathoms; the apex of Pagassan bearing W.  $\frac{1}{2}$  N. leads close to the southward, and the east end of Lampassan N. by W.  $\frac{1}{4}$  W. leads westward of a  $4\frac{1}{2}$ -fathom shoal lying 3 cables from the west end of Carrington reefs.

**SOUTH-EAST BANGUEY DANGERS** comprise an extensive group of reefs and shoals 10 miles long, E. by N.  $\frac{1}{2}$  N., and W. by S.  $\frac{1}{2}$  S., and nearly 5 miles broad, situated  $1\frac{1}{2}$  miles eastward of Carrington reefs. The west end of the group is defined by two small isolated reefs, dry at low water and steep-to; the northern reef lies almost half a mile, and the southern somewhat more from the body of the dangers, with depths of 12 fathoms between; a good look-out is essential when nearing them, and the same precaution will have to be observed when passing through the channel, as the reefs forming the southern edge of these dangers are all steep-to. A space, about 2 miles in extent, at the eastern part of South-east Banguay dangers, is studded by a number of coral patches with  $1\frac{3}{4}$  to  $3\frac{3}{4}$  fathoms water, and from the outer, or eastern one, the apex of Latoan island bears N.W. by W.  $\frac{3}{8}$  W.,  $9\frac{1}{2}$  miles; Banguay peak W. by N.  $\frac{1}{4}$  N., 24 miles; and the apex of Mallawallé S.W. by W., 14 miles.

**Bancawan channel**, separating Bancawan reefs from South-east Banguay dangers, is three-quarters of a mile wide at its narrowest part, near the middle. The channel is nearly straight, and lies in a N.E. by E. and S.W. by W. direction; but it will be necessary to be guided by a vigilant look-out for the reefs on each hand bounding the channel: with proper precautions there will be no difficulty in taking a vessel safely through.

**Directions for Banguey South channel.**—Having rounded Sampanmangio point, steer to the eastward for Molleangan islands (*see* page 146), and when within 2 or 3 miles of them, open Little Molleangan west of the apex of Molleangan island, and steer east into the channel; being careful not to open the whole of Patanunam—a black round looking island when viewed from near the entrance of the channel—east of Molleangan island, until the apex of Little Molleangan bears N.N.E., which will lead clear of Outer shoal. Having passed Little Molleangan steer more to the north-eastward, keeping a mile or so off Molleangan and Patanunam; having past those islands, being the apex of Patanunam to bear W.  $\frac{3}{4}$  S. and steer E.  $\frac{1}{4}$  N. through the fairway between the South channel dangers and the rock off the south end of Pagassan, until the summit of the hill at the southern part of Pagassan bears W.  $\frac{1}{4}$  N., thence steer East for a mile or so, until the bearing changes to W.  $\frac{1}{2}$  N.-northerly; when an E.  $\frac{1}{2}$  S.-southerly course will lead clear of the dangers off the north part of Mallawallé, until the highest hill of Mallawallé bears S.W.  $\frac{1}{2}$  S., then steer a little to the southward—to give a wider berth to the S.E. Banguey dangers—until the hill bears W.S.W., when an E.N.E. course will lead between the outer part of the S.E. Banguey dangers and Fairway shoal, and out of the channel into the Sulu sea.

In the directions for Banguey South channel, given above, such bearings have been selected for the safe conduct of vessels as are most available for that purpose; but, although it can hardly be necessary, it seems prudent, in view of the exceptionally dangerous character of the navigation, to remind seamen that those bearings should not, and cannot, be relied upon in the sense that objects in line can be, especially when the objects are distant; they will serve, very usefully, to assist in the safe guidance of vessels, but attention to them must be supplemented by a most vigilant and careful look-out from aloft. The best time for proceeding through from the westward is with the sun astern, when there is seldom much difficulty in making out the various dangers as the vessel advances.

**BANGUEY EAST COAST AND DANGERS.**—The east coast of Banguey is fronted by dangers which extend off several miles; they consist, for the most part, of extensive reefs, dry at low water, separated from each other by narrow channels.

**Bancawan and Latoan islands and reefs** comprise five islands, several extensive reefs, and many small detached dangers, the whole forming a group 7 miles long North and South, and  $5\frac{1}{2}$  miles broad. Boats only can pass between the various reefs comprising this group, but between them and the reef fronting the Banguey shore there is a deep water channel through which it is possible for small vessels to pass,

although, near the west point of Bancawan the channel is narrowed to little more than a cable by a small reef in the middle.

Bancawan, situated about a mile from the east coast of Banguey, is an irregular shaped flat island,  $2\frac{1}{2}$  miles long North and South, and  $1\frac{3}{4}$  miles broad; having close to the east side an island, with an islet off its north-east point; and a little more than a mile south-eastward of it, a small round island, from which a narrow tongue of sand projects three-quarters of a mile in a south-easterly direction. From the south point of Bancawan numerous small reefs extend for about 2 miles, which with the reef extending half a mile south-eastward of the tongue of sand, form the northern limit of Bancawan channel (*see* page 155).

Latoan,  $1\frac{1}{2}$  miles north-eastward of Bancawan, is an oval-shaped island, a mile long N.W. and S.E., the trees upon it rising to an apex near the centre. It is situated at the south-west part of a dry reef, which extends  $2\frac{1}{2}$  miles eastward,  $1\frac{1}{2}$  miles north eastward, and  $1\frac{1}{2}$  miles northward of it. A large reef lies to the westward of Latoan, upon which trees are growing.

East Banguey patches are two small coral shoals lying three-quarters of a mile and a mile, respectively, outside the Bancawan reefs; the western patch has 12 feet upon it, and the eastern 16 feet: from which Latoan apex bears W.N.W.  $3\frac{3}{4}$  miles, and the left extreme of the round island (south-eastward of Bancawan) S.W. by W.  $\frac{1}{4}$  W.,  $4\frac{1}{4}$  miles.

Outer Latoan patch is the easternmost of three isolated patches which lie close to the north-east edge of the large reef surrounding Latoan; it is about 2 miles in circumference, with 6 to 18 feet water in most parts, and a rock, a few feet under water near its eastern edge: from which Latoan apex bears S.W. by W.  $\frac{3}{4}$  W.,  $3\frac{3}{4}$  miles.

**May Williams shoal**, situated N. by E.  $\frac{1}{2}$  E. nearly 3 miles from Latoan island, is 9 cables long N.W. and S.E., and 4 cables broad, having  $2\frac{1}{2}$  to 3 fathoms water over it; from its south-east end Kahamkamman islet bears N.W. by N., distant 2 miles, and the apex of Latoan S.S.W.  $\frac{1}{2}$  W., distant  $3\frac{1}{2}$  miles; around the shoal are depths of 7 to 9 fathoms.

**Kahamkamman** is a small islet, 2 miles south-eastward of East Guhuan; it stands near the north-west end of a coral shoal about a mile in extent, the part surrounding the islet drying at low water.

South-westward of this shoal, and separated from it by a  $5\frac{1}{2}$ -fathom channel, about half a mile wide, is another shoal about three times as large having three islets, a sand cay, and several extensive patches of reef (dry at low water) upon it; the islets lie nearly in a N.E. and S.W. direction, the north-easternmost being the largest, and Balundangan, the south-easternmost, the smallest. A mile south-westward of Balundangan and 3 cables inside the edge of the reef fronting the Banguey shore is an island

about  $1\frac{1}{4}$  miles long, and half a mile broad with an apex near its centre; this island lies rather more than half a mile off the coast, which is covered with mangrove.

**Samson patches**, three in number, have  $3\frac{1}{2}$  to 5 fathoms water on them; they lie eastward of Kahamkamman near the 10-fathom line defining the edge of the shoal bank extending from the shore, close outside of which are 14 to 16 fathoms: from the outer patch Kahamkamman bears W.  $\frac{1}{2}$  N., 3 miles, and the apex of Latoan S.W.  $\frac{1}{2}$  S., nearly  $5\frac{3}{4}$  miles.

### BALÁBAC STRAIT.

Balábac strait, leading from the China sea into the Mindoro or Sulu sea is bounded on the south by Balambangan and Banguay islands, and on the north by Balábac island. The greater part of this strait is occupied by coral dangers far too numerous to admit of detailed description. These dangers are divided into groups, each group being distinguished by a special denomination—such as Mangsee danger bank, Great danger bank, &c. This arrangement distinctly defines the limits of the various channels between the dangers.

Balambangan and Banguay have been previously described we will now proceed to describe Balábac island, the high peak of which is the most conspicuous object in the vicinity of the strait, and visible from all parts of it. Banguay and Balábac peaks lie N.  $\frac{1}{2}$  E. and S.  $\frac{1}{2}$  W. from each other,  $37\frac{1}{2}$  miles apart, and as most of the dangers and channels are to the eastward of that line, these peaks are of the first importance for determining the position of vessels when navigating this dangerous strait.

**BALÁBAC ISLAND**, lying off the south-west extremity of Palawan island and about 26 miles northward of Balambangan, is nearly 20 miles long North and South, and 9 miles broad. On the southern half of the island are several ranges of high hills, exhibiting great variety in the outline of their summits; only two, however, are of sufficient importance to require particular description. Steep-fall range, about 2 miles from cape Melville, the south point of the island, is composed of several hills in a semicircular form, convex to seaward, and being nearly of the same elevation, 850 feet, present a table-topped appearance, whence the sides fall in a very precipitous manner; hence the name. These features will enable strangers to recognise this range from the small range at the south-west extreme of the island, the highest part of which is but 330 feet. From Steep-fall range, hills less elevated extend in a north-westerly direction nearly as far as the west extreme of the island; on the north side of Steep-fall, other ranges, varying in height from 1,200 to 1,300 feet, extend to Dalawan bay; these are separated from the still higher ranges of Balábac peak by a valley which lies in a W.N.W. direction across the island.



Balábac peak, near the eastern shore, 5 miles northward of Steep-fall range, has the greatest elevation on the island, 1,890 feet. Eastward of this peak some ranges slope towards Deláwan bay and the shore northward of it; and northward of these, separated from them by a valley, other ranges extend along the coast as far as Calandórang bay; westward of the peak is a range of six or seven sharp peaks, extending in a N. by E. direction to the inner part of the same bay, and westward of this range are several lower ranges, which stretch nearly as far as the west extreme of the island, joining those which extend from Steep-fall range. On the northern part of the island, beyond Calandórang bay, are several detached hills, the highest, 750 feet, being situated near the coast,  $1\frac{1}{2}$  miles northward of the bay.

The west coast of Balábac cannot be closely approached on account of numerous reefs and shoals which extend several miles off. It seems only necessary, therefore, to observe that the coast trends from the south-west point of the island in a N.N.W. direction for about 6 miles, to a flat peninsula projecting about  $1\frac{1}{2}$  miles. West point, the north-west extreme of this peninsula, shows out distinctly when viewed from the N.W. and S.W., and is an useful object for cross-bearings, when nearing the shoals. From the peninsula the coast trends northerly for 3 miles, to a point with two hills over it; thence it curves into a small bay, from the further point of which the shore recedes a little as far as Blind harbour, and, beyond that opening, trends north-eastward to cape Disaster, the north point of the island.

Blind harbour is an opening nearly 2 miles wide, having the appearance of a capacious bay, being  $4\frac{1}{2}$  miles in extent. It is, however, blocked with coral, except near the points at the entrance, where there is a narrow channel between the reefs, with 9 and 10 fathoms water.

To the eastward of the northern entrance point the shore recedes  $2\frac{1}{4}$  miles, where there is a small opening in the mangroves, probably communicating with the head of Candaráman inlet (the northernmost of three inlets on the east coast), the distance across being only three quarters of a mile. Off the south point of Blind harbour is a small islet, lying 3 cables from the shore.

From Blind harbour to cape Disaster, and round the northern extremity of the island, the coast is low, with two small cliffy hills a little inland. The coast reef at low water dries nearly a mile from the shore.

The eastern side of Balábac island is tolerably bold, with deep water close to the shore. From cape Melville the coast to Daláwan bay trends north-east, and is steep-to, except at the cape, off which reefs, dry at low water, extend nearly half a mile.

The coast northward of Daláwan bay trends North a little westerly, is fringed by a reef, which extends from one to 2 cables from the shore, and has three small inlets. From Candaráman inlet the coast takes a more westerly direction for  $2\frac{1}{4}$  miles to Encampment point, a small bushy isthmus nearly a mile eastward of cape Disaster.

**DANGERS OFF BALÁBAC.**—From cape Melville the shore reef extends off half a mile, and from the south-west point of the island nearly a mile; some distance outside these reefs the ground is foul, with detached shoal spots here and there; the southernmost, a 3-fathom patch, lies with cape Melville, bearing N.E. by E.  $1\frac{1}{2}$  miles, and the south-west extreme of Balábac island N. by W.  $\frac{1}{4}$  W.  $1\frac{1}{2}$  miles: vessels should not come nearer than 2 miles to the coast between cape Melville and the south-west point of Balábac.

**Gnat reef**, 5 miles in circumference, is separated from the shore reef, extending from the south-west part of Balábac island by a narrow channel having in it numerous shoals; near the centre of this reef lies a sand cay, from which the south-west point of the island bears S.E.  $\frac{1}{2}$  E.,  $2\frac{3}{4}$  miles nearly. The channel between Gnat and the shore reefs leads to a small bay with a fishing village at its head; some distance southward and south-westward of Gnat reef the ground is foul.

**Balábac Great reef**, the largest danger off the west coast, is 9 miles long, North and South, and 3 miles broad at its southern part; from the northern end a narrow neck projects eastward, on the extremity of which is a large sand patch, with coral extending half a mile to the northward and southward. Its south-east part is about a mile north-westward of Gnat reef, and its centre abreast the peninsula protruding from the coast. The channels between this reef and those extending from the shore are intricate, and abound with dangerous patches, so that they are unavailable for anything but boats and native proas.

The south extreme of the reef lies W.N.W.  $6\frac{1}{4}$  miles from cape Melville, and  $4\frac{3}{4}$  miles from the south-west point of Balábac; thence the outer edge trends W.N.W. one mile, north-westward,  $1\frac{1}{2}$  miles, northerly  $2\frac{1}{4}$  miles, N. by E.  $3\frac{1}{4}$  miles, and north-easterly  $2\frac{1}{2}$  miles. Northward of Great reef, and separated from it by a deep-water channel a third of a mile wide, lies a projection of the shore reef, which terminates in a point  $2\frac{1}{2}$  miles from the coast.

Cape Melville bearing E. by S.  $\frac{1}{4}$  S. leads close to the dangers southward of Gnat reef, and about a mile south of Balábac Great reef.

**Ada reef**,  $2\frac{1}{2}$  miles long E.N.E. and W.S.W., and three-quarters of a mile broad at its west extreme, lies a mile outside the shore reef, the channel between having numerous shoals and patches of reef. From the north-west extreme of Ada reef Balábac peak bears S.E. by E.,  $11\frac{1}{2}$  miles,

and the apex of the hill over the northern point of Blind harbour N.E. by E.  $\frac{1}{4}$  E.  $6\frac{1}{2}$  miles.

Ada reef is connected by a coral bank having less than 3 fathoms water, with the dangers off Blind harbour.

**South-western Bank**,  $6\frac{1}{4}$  miles long N.W. by W.  $\frac{1}{2}$  W. and S.E. by E.  $\frac{1}{2}$  E., and from half to  $1\frac{1}{4}$  miles broad, fronts the south-west parts of Gnat and Great reefs, the outer edge being distant from those dangers  $2\frac{1}{2}$  to 3 miles. The least depth found upon the bank is  $3\frac{3}{4}$  fathoms, about a mile from its south-east extreme, close to which are some 5-fathom patches; at the opposite end the depths are 4 to 5 fathoms, and 6 to 10 fathoms elsewhere. When standing towards this bank in fine weather the several shoal patches will be easily discerned, and the soundings decreasing to less than 20 fathoms will also point out its proximity; Balábac peak bearing about N.E.  $\frac{1}{4}$  N. leads over the  $3\frac{3}{4}$ -fathom patch, and bearing N.E. by E.  $\frac{1}{2}$  E., over the centre of the 4-fathom patch at the north-west end of the bank. Between the bank and the reefs the depths are about 16 or 17 fathoms in mid-channel, decreasing towards the reefs, near to which are some patches of 10 and 6 fathoms.

Two patches of 9 and 10 fathoms, with 14 to 17 fathoms around them, lie about S.W. by S.  $1\frac{1}{2}$  and  $2\frac{1}{4}$  miles, respectively, from the south-west point of Balábac; and a depth of 7 fathoms, with 14 to 20 fathoms around, lies W. by N.  $\frac{1}{2}$  N. a mile from the north-west end of South-western bank, with Balábac peak, bearing W.S.W.

**Western Shoals** comprise several small coral banks, lying off the west side of Balábac Great reef: from about 2 miles northward of South-western bank these shoals extend nearly 8 miles in a northerly direction, thence north-eastward, terminating half a mile from Ada reef. Westward of peninsula head, the shoals, under a depth of 10 fathoms, are divided into three groups by channels half a mile wide, with 11 to 16 fathoms water.

The southern group has 21 feet, the centre group 14 feet, and the northern 18 feet least water.

**North-west Shoal**, situated about 3 miles north-eastward of Ada reef, is  $2\frac{1}{2}$  miles long N.E. by E. and S.W. by W., and half a mile broad. This is a dangerous shoal, having as little as 10 feet over some parts, and only 15 to 18 feet over the greater part of it. Balábac peak, bearing S.E.  $\frac{3}{4}$  S., leads south of North-west shoal; and cape Disaster, E.  $\frac{1}{2}$  N., leads clear of the north-east end of this shoal.

**Directions.**—When standing towards the dangers off-lying the west coast of Balábac in the afternoon, when the sun will be astern, the outer shoals, and also the reefs will generally be seen from a long distance, and in sufficient time to avoid them; but if the sun be ahead, the outer shoals are difficult to make out until close to them. The soundings are so variable

and uncertain, under depths of 30 fathoms, as to afford little assistance. A good look-out is therefore of the first importance. At night the soundings must be carefully attended to if near these dangers, and vessels should not approach to a less depth than 40 fathoms off the south-west and west parts of the island, nor 50 fathoms off the north-west part.

**Clarendon Bay**,\* situated three quarters of a mile north-east of cape Melville, is nearly one mile deep in a north-westerly direction, and half a mile broad, with 6 to 9 fathoms, mud; from the southern entrance point the shore reef extends off a very short distance, but from the northern entrance point it projects more than two cables in a south-east direction, narrowing the entrance to barely three-quarters of a cable.†

**Daláwan Bay**,\* situated  $5\frac{1}{2}$  miles north-east of Clarendon bay, is convenient for wooding and watering, and affords good shelter with south-westerly winds; from its entrance Balábac peak bears N.W.  $2\frac{1}{2}$  miles.

Daláwan bay will be readily recognized by the low land extending in a W.N.W. direction from the beach across the island, separating the high land about Balábac peak from Transept hills, a smooth table-topped hill on the south side of the bay.

The bay is about a mile wide from shore to shore at the entrance, and about three-fourths of a mile deep. Reefs, which dry at low water, project from both points at the entrance, contracting the channel to a little less than 7 cables; that on the northern side has a rock at its extremity named Buoy rock, lying South 2 cables from the shore, and which, from being generally uncovered, forms an excellent guide to enter the bay. The spit on the south side dries only  $1\frac{1}{2}$  cables from the shore, but rocky ground extends  $3\frac{1}{2}$  cables beyond this in a north-easterly direction, having in some parts only 3 fathoms water, with 5 and 7 fathoms close to the edge. The depth between the spits is 15 fathoms, gradually shoaling over a muddy bottom towards the sandy beach. When outside the bay the soundings increase rapidly, being upwards of 90 fathoms 2 miles from the shore.

There is a white rock on the shore in the south-western corner of the bay,  $1\frac{1}{2}$  cables to the northward of which is the entrance of the river, where the sand is constantly shifting in consequence of the freshets scouring the channels, through which boats deeply laden can pass at high water.

A reef of rocks one cable in extent, showing only at low water springs, lies to the eastward of the entrance of the river, upwards of 2 cables from the beach, with 4 fathoms, mud, close to its outer edge. From this reef

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\* See Admiralty plan of Clarendon and Daláwan bays, on sheet, No 966; scale,  $m=4$  inches.

† H.M. Gun-vessel *Avon*, used Clarendon bay as a place of shelter from S.W. gales when engaged in recovering guns and stores from the wreck of the *Gnat*, 1869, on Gnat reef.

Buoy rock bears N.E. by E.  $\frac{1}{3}$  E.  $8\frac{1}{2}$  cables, and the south point of the bay, a low mangrove-bush, S.E.  $\frac{1}{2}$  S.

The shores of the bay are densely wooded, the entrance on either side being fronted with mangrove. The best anchorage is about the centre of the bay in 9 fathoms, mud, nearly half a mile from the beach.

**Water.**—South-eastward about a quarter of a mile from the White rock, where the mangrove joins the foot of the hills in Dalawan bay, is a rivulet of good water; there are also one or two good streams on the northern shore of the bay, but neither of them was found so eligible for the purpose of watering as the river; in the dry season the water must be obtained some distance up to be good. The river is navigable for boats on ordinary occasions about a mile, where there are a few houses and some cultivated ground occupied by Malays, who, as opportunities offer, act the parts of pirates or husbandmen. Their character is decidedly questionable, and merchant boats' crews should be on their guard. H.M.S. *Royalist*, when at anchor here in June 1853, received two captives who escaped from the shore, and found their way on board at midnight. Their owners claimed them the following day, and on being refused, evinced afterwards a decided hostility, and from that time abandoned all further intercourse although previously they were anxious to barter goats, fowls, yams, &c., and always received us hospitably at the village.

**Tides.**—It is high water, full and change, at Daláwan bay at 11 h.; springs rise 5 feet.

**Calandórang Bay,\*** or Puerto del Principe Alfonso, situated 6 miles northward of Daláwan bay, is a Spanish settlement, established a few years ago for the purpose of developing the trade of Palawan† and other neighbouring islands; it has not yet succeeded, however, in making any progress, for there is absolutely no trade whatever. It is a naval establishment, under the charge of a lieutenant, and the station of a gunboat, employed in the suppression of piracy; a few troops, sailors, and convicts comprise nearly the whole of the inhabitants, the only natives being a few fishermen.

No supplies of any kind are to be procured; bullocks, and other necessities for the use of the garrison, being sent periodically from Manila.

The bay is 6 cables wide at its entrance, and  $1\frac{1}{2}$  miles deep, contracting at the north-west corner into a narrow inlet, a little over a cable broad, and which is said to extend some distance inland. The south point of the entrance is formed by a hill 105 feet high, named Almirante Gil, the north point is mangrove, with hills a short distance inside: coral and shoal water extend nearly a cable off both points.

\* See Admiralty plan of Calandórang bay, on sheet, No. 966, scale,  $m = 4$  inches.

† This island is always known to Spaniards by the name of Paraquas.

On the south shore nearly  $1\frac{1}{2}$  cables within the south entrance point is a coal store and small jetty, a short distance further are two bluffs, or heads, projecting, from the higher ranges on to the beach; from the eastern bluff, coral dry at low water, and shoal soundings, extend about a cable, and from the western a coral ledge stretches out rather more than half that distance. Beyond the bluffs, about half a mile from the entrance, is the landing pier, the town being built on the shore of the bay westward of it, and terminating at a third bluff, or spur, protruding from the high range of hills behind. The north shore of the bay is all mangrove: from two points, about half a mile within the entrance, coral dry at low water, extends off about  $1\frac{1}{2}$  cables; and from a point opposite the town, a coral reef, with some rocks above water, extends off almost as far.

The soundings at the entrance of the bay are 24 or 22 fathoms, a short distance within they decrease to 16 and 10 fathoms, and, in quick succession, to 5 and 3 fathoms. The 3-fathom line trends from a little inside the coal store N.W.  $\frac{1}{2}$  W. in a direction across the harbour: within this line the soundings decrease gradually to the mud flat which fills up the inner part of the port: off the town are depths of  $1\frac{1}{2}$  to 2 fathoms, according to the distance from the shore.

A 3-fathom patch, with  $3\frac{3}{4}$  fathoms around it, lies off the first bluff westward of the coal store; with the lighthouse bearing E.  $\frac{1}{4}$  S., and the block-house S.W.  $\frac{1}{4}$  S.

**The Anchorage** in Calandórang bay is good, the bottom being mud, and during the south-west monsoon it is perfectly sheltered and secure; a convenient berth for a moderate sized vessel is just outside a line between the lighthouse and the dry rocks, with the former bearing E. by S.  $\frac{1}{2}$  S., the bluff westward of the town S.W.  $\frac{1}{2}$  W., and the block-house fort, a white octagonal-shaped building S.W. by S.: small vessels can go farther in on the line of bearing of the bluff, just mentioned, and anchor where most convenient. The north-east monsoon occasionally blows into the bay with considerable force, sending in, also, a nasty chop of a sea, so that it is better, at that season, to anchor more towards the north shore, taking care to have plenty of room for veering.

**Tides.**—It is high water, full and change, at Calandórang bay at 11 h.; springs rise 6 feet.

**LIGHT.**—On Almirante Gil stands a square tower painted white with a red base, and surmounted by a red lantern, from which at an elevation of 119 feet above the sea, is exhibited a *fixed* white light, which should be visible in clear weather from a distance of 10 miles.

This light is not to be depended on.

**Directions.**—A steam vessel will find no difficulty in entering Calandórang bay, guided by the chart. Steer in mid-way between the entrance points and when the light-house bears S.S.E. edge to the south-

westward, in the direction of the bluff, westward of the town, proceeding slowly, and carefully attending to the soundings, which will be found to decrease quickly. If requiring coals, (which, however, are not to be had in abundance,) after passing the lighthouse, bring the coal jetty to bear S.W. by S. and steer towards it cautiously, anchoring at a convenient distance.

This port is difficult and dangerous of access for sailing vessels, on account of the deep water outside, and of the strong tides and currents which sweep along the east coast of Balábac, in the strength of the monsoon. A sailing vessel bound for that port should be provided with a heavy kedge, and stout hemp, or coir, cable, to enable her to anchor in deep water, in case of missing the port, which she should not attempt to make without a commanding breeze. About 3 or 4 cables off the port the depths are 35 and 40 fathoms, and a mile off they are over 100 fathoms. A vessel coming from the southward should make for Daláwan bay, if the wind be likely to fail, and await a more favourable opportunity for entering Calandórang bay; for if the wind should fail when within a mile or so of the port the vessel would be swept towards the numerous dangers to the northward.

**MANGSEE GREAT REEF**, situated  $4\frac{1}{2}$  miles northward of North Gubuan, and a little over 3 miles, in the same direction, from the Louisa shoal; is 5 miles long E. by N. and W. by S., and  $2\frac{3}{4}$  miles broad. It is nearly everywhere covered at high water, but a sand cay upon the eastern part is generally visible from aloft when near the edge. At low water the reef presents a vast expanse of coral and sand, with lagoons here and there.

From the west end of the reef, shoal water, under 10 fathoms, extends about 2 miles in a W.S.W. direction; the soundings over this part are very irregular, and, although the least depth known is 4 fathoms, the locality should be avoided. From the outer part of this shoal water Banguay peak bears S.S.W.  $\frac{1}{4}$  W., and the apex of North Mangsee island N.E. by E.  $\frac{1}{2}$  E. At the south-west part of the reef the 10-fathom line is more than half a mile off, but along the southern edge its distance varies from one to 4 cables. At the eastern side, shoal water under 3 fathoms projects half a mile in the direction of the Mangsee islands; and similar shoal water, but extending only half as far, fronts the whole northern edge of the reef; at the north-east part, the 10-fathom line is 6 cables distant.

**The MAIN CHANNEL** through Balábac strait is limited to the southward by the danger line, encompassing the reefs and shoals lying off the north and north-east coasts of Banguay (*see* page 147); and to the northward by Mangsee Great reef, the southern part of which is  $1\frac{1}{2}$  miles

distant from the edge of the bank on the Banguey side. The depths in the channel are not regular, varying from 14 to 23 fathoms, the deepest water being rather nearer the reef than the middle of the channel.

**Directions.**—Vessels coming from the south-westward, and bound through Balábac strait, during the north-east monsoon, will find Main channel the most convenient, attending to the following directions :—When nearing the north-west part of Balambangan island, do not bring point Buttun to the westward of S.W.  $\frac{1}{2}$  S., nor come into less than 14 or 13 fathoms, in order to keep clear of the dangers extending from the shore, and of the Siagut shoal (*see* page 143.) Siagut point, the north point of the island, must not be approached nearer than 2 miles, nor under a depth of 8 fathoms; North hill, on the north part of Banguey, if not brought to bear eastward of E. by S.  $\frac{1}{4}$  S. will lead half a mile outside all the dangers off Siagut point, as also those extending north of Tiga islet, which last should not be neared to a less distance than a mile, or under a depth of 8 or 7 fathoms. From Tiga islet the Banguey coast may be approached to 9 or 8 fathoms, until North Guhuan bears about S.S.E., when it will be well, especially for large vessels, not to come into less than 12 fathoms, as the sudden variations of the soundings on the bank extending from the north and north-east coasts of Banguey are very alarming, and no less perplexing, to strangers. The light green colour of the water over Great Mangsee reef will, even at high tides, enable a good look-out aloft to make out the edge sufficiently far off to permit of a vessel being guided past it at a safe distance; and when on the south side of the channel the first cast of 10 fathoms, or under, will denote the edge of the bank. Having brought the apex of North Mangsee to bear westward of North, to clear Banguey Outer care is necessary to avoid bringing North hill to the westward of S.W. by W.  $\frac{1}{2}$  W. until the west extreme of North Mangsee is shut in behind South Mangsee N.E. reefs.

Coming from the Sulu sea the Mangsee islands should be made bearing about West, when a course about W.S.W. will lead to the entrance of Main channel. If, however, the channel should be made more from the southward, as the apex of North Mangsee begins to shut in behind the southern island, and the soundings be 14 or 13 fathoms, a vessel will be towards Banguey Outer N.E. reefs, and care must be taken to bring North hill of Banguey to the southward of S.W. by W.  $\frac{1}{2}$  W. before proceeding further to the westward.

**MANGSEE DANGER BANK** situated about  $1\frac{3}{4}$  miles northward of Mangsee Great reef, includes within its limits the Mangsee and Salingsingan islands, with the extensive dangers adjacent, also Loxdale and Jessie shoals, besides many smaller. This bank is 10 miles long



E. by S.  $\frac{1}{2}$  S. and W. by N.  $\frac{1}{2}$  N., and  $4\frac{1}{2}$  miles broad at the eastern end, tapering to a point at the opposite extreme.

**South Mangsee Island** covered with trees, is round shaped, about half a mile in diameter, and stands upon a reef which extends from it a mile eastward, 6 cables westward, half a mile south-eastward, and less distances in other directions.

**North Mangsee Island** situated half a mile north-westward of South Mangsee, is covered with trees, which rise to an apex near the centre, 130 feet above the level of the sea. The island is nearly three quarters of a mile long and about a quarter of a mile broad; from its east end reefs and shoals extend—beyond those projecting from South Mangsee—for a distance of  $2\frac{1}{4}$  miles, and some patches of 4 to 7 fathoms half a mile further in an easterly direction: from the west end a line of reefs and shoals extend in a W. by N.  $\frac{3}{4}$  N. direction, nearly  $3\frac{1}{2}$  miles.

**Jessie Shoal**, with 6 feet water, lying  $2\frac{1}{2}$  miles E. by N. from North Mangsee island, is  $1\frac{1}{2}$  miles long, E.N.E. and W.S.W., and half a mile broad. This danger is situated at the east part of the bank, and shoals extend from it in a south-easterly direction: from a depth of 10 fathoms near the extremity of these shoals, Salingsingan bears N.W. by W.  $\frac{3}{4}$  W.  $4\frac{1}{4}$  miles, and the left extreme of South Mangsee island W.S.W.  $3\frac{1}{2}$  miles.

**Salingsingan Island** is composed of coral and sand, covered with trees; it is rather more than half a mile long, N.W. by W.  $\frac{1}{2}$  W. and S.E. by E.  $\frac{1}{2}$  E., and 200 yards broad at its west end, tapering to a point at its east end; from which a reef extends 4 cables in a S.E. by E. direction; but from other parts, only a short distance. A shoal, nearly awash in parts, stretches off three-quarters of a mile eastward, and,  $1\frac{3}{4}$  miles westward, from the island, the breadth of the latter being nearly a mile; another shoal, separated from it by a narrow deep-water passage, and extending off nearly three-quarters of mile N.W. by W. from the island.

**Loxdale Shoal**, forming the west end of the bank, lies  $1\frac{1}{4}$  miles westward of the dangers extending from the islands of North Mangsee and Salingsingan, the depths between being from 22 to 34 fathoms. It is a coral shoal, nearly  $1\frac{3}{4}$  miles long, E.  $\frac{3}{4}$  N. and W.  $\frac{3}{4}$  S., half a mile broad at its eastern part and 3 cables at its opposite end; over it are  $2\frac{1}{4}$  to 3 fathoms water, the shoalest part being at the north-east extreme, close to which are 24 fathoms, and close to the east extreme 16 to 30 fathoms; elsewhere soundings of 4 and 5 fathoms extend off a short distance. From the west end of this danger Banguey peak bears S.S.W., South Mangsee island S.E. by E.  $\frac{1}{2}$  E., and Salingsingan E.  $\frac{1}{4}$  S.

**MANGSEE CHANNEL**, separating Mangsee Great reef from Mangsee Danger bank, is a mile wide at its narrowest part, where the

depths are irregular, there being 14 to 17 fathoms near the reef and 24 to 33 towards the Mangsee Danger bank.

**Directions.**—Navigators will rarely have occasion to use this channel, but in case of necessity the following directions may be of assistance :—Coming from the westward, and having sighted the Mangsee islands, bring the centre of South Mangsee island to bear E. by S. and steer for it, carefully preserving the bearing ; when the west end of North Mangsee bears N.E. by E.  $\frac{3}{4}$  E. steer S.E. by S., passing midway between the islands and Great reef. With a vigilant look-out no difficulty will be found in passing safely through this channel.

Coming from the eastward a vessel must be guided by the look-out alone to the entrance of this channel, thence pass through the middle, steering a N.W. by N. course ; and when the west end of North Mangsee bears N.E. by E.  $\frac{3}{4}$  E. and the centre of South Mangsee E. by S., steer W. by N. out of the channel.

**GREAT DANGER BANK** comprises many shoals, amongst which no vessel should venture. It is 14 miles long in a W.N.W. and S.S.E. direction, and 8 miles broad at its north-west end, gradually decreasing in breadth towards the south-east extreme.

**S. E. Shoals** comprise several small coral patches situated near the south-east extreme of Great Danger bank, extending over a space about 3 miles in diameter, with depths of  $1\frac{1}{2}$  to  $4\frac{1}{2}$  fathoms, the depth of  $1\frac{1}{2}$  fathoms being nearly 2 miles W. by S.  $\frac{1}{2}$  S. from the south-east extreme of the bank. From the south-east extreme of Great Danger bank Balábac peak bears N.W.  $\frac{5}{8}$  W., North Mangsee apex S.W. by W.  $\frac{7}{8}$  W. and Banguay peak S.W.  $\frac{1}{4}$  W. westerly.

**Sand Cay**, the only conspicuous object marking any part of the bank, stands at the southern side of it, about 5 miles westward of the south-east extreme, and  $3\frac{1}{2}$  miles northward of the east end of Mangsee Danger bank. This cay is situated near the centre of a narrow coral reef, 3 miles long, from each end of which shoal water (under 3 fathoms) extends about half a mile, and shoal patches of  $3\frac{1}{4}$  to 4 and 5 fathoms in an easterly direction, nearly joining the S.E. shoals, and in a northerly direction nearly as far as the Middle shoals.

Shoal water extends a short distance southward of the reef, but to the northward a mile, with soundings of 5 to 8 or 9 fathoms a mile farther : thence to the northern edge of the bank the soundings are 20 to 26 fathoms. From the centre of the cay the left extreme of South Mangsee bears S.W.  $\frac{5}{8}$  S. 6 miles, centre of Salinsingan W. by S.  $\frac{3}{4}$  S. 5 miles, and Balábac peak N.W.  $27\frac{1}{2}$  miles.

**Middle Shoals** are a cluster of coral patches lying near the middle of Great Danger bank ; the southernmost shoal is the largest, and has as

little as 12 feet water over some parts of it ; over most of the other shoals are depths of  $2\frac{3}{4}$  to 3 and 4 fathoms, but the northermost has nowhere less than 5 fathoms.

**North Patches**, two in number, lie along the north edge of the bank, and have nowhere less than  $3\frac{1}{2}$  fathoms water over them ; the eastern patch is  $1\frac{3}{4}$  miles long, East and West, and half a mile broad, the western patch, 6 cables westward of it, is about a mile in extent : the east end of these patches forms the north-east extreme of the bank, the east edge trending sharply to the southward.

**N.W. Shoals**, situated at the north-west extreme of the bank, occupy a space  $5\frac{1}{4}$  miles long, in an E.N.E. and W.S.W. direction, and  $1\frac{1}{2}$  miles wide ; those under a depth of 3 fathoms extend over the middle part of this space for a distance of  $3\frac{1}{4}$  miles, and near the eastern end there is a depth of only 9 feet ; from the 10-fathom line bounding the north-western extreme of the shoal patches, Banguay peak bears S. by W.  $\frac{3}{4}$  W., Balabac peak N.W.  $\frac{3}{4}$  N., Lumbucan N.  $\frac{1}{2}$  W., and Salingsingan S.S.E.  $\frac{3}{4}$  E.

**MIDDLE CHANNEL**, separating Mangsee Danger bank from Great Danger bank, is a mile wide at its narrowest part, between the shoals extending nearly three-quarters of a mile eastward of Salingsingan and those extending 3 miles westward of Sand cay, increasing in width towards both ends.

The soundings at the western part of the channel vary from 20 to 34 fathoms, and 24 and 28 fathoms close to Loxdale shoal ; in the centre part of the channel the depths are 27 to 32 and 36 fathoms near the middle, decreasing to 28 and 25 fathoms towards the Salingsingan shoals, and to 21 and 19 fathoms towards those on the opposite side.

**Directions.**—Middle channel lies out of the ordinary route of vessels, but it may be used if necessary, by attending to the following directions :—Coming from the westward shape a course to sight Salingsingan island between the bearings of E. by S.  $\frac{1}{2}$  S. and S.E. ; the former bearing leads a quarter of a mile northward of Loxdale shoal, and the latter close to 9 fathoms on the edge of Great Danger bank. Having arrived within 4 or 5 miles of Salingsingan, the fairway course through the channel is E. by S.  $\frac{3}{4}$  S., passing a good mile northward of Salingsingan, and bearing in mind that shoal water stretches off nearly a mile in a N.W. by W. direction from that island. Being past Salingsingan the Sand cay should be seen about three points on the port bow ; proceed on the same course and pass out of the channel, remembering that the centre of Salingsingan bearing W. by N.  $\frac{1}{2}$  N. leads close to the Jessie shoal, and bearing W.  $\frac{1}{4}$  S. close to the edge of the Great Danger bank.

Coming from the eastward, the channel must be approached cautiously, and if near the south-east part of Great Danger bank care must be taken not to bring the apex of North Mangsee to the southward of W. by S.  $\frac{3}{4}$  S., and a good look-out kept for the Sand cay and Salingsingan; when the latter is sighted the centre must be brought between the bearings of W. by N.  $\frac{1}{2}$  N. and W.  $\frac{1}{2}$  S., and a mid-channel course, W. by N.  $\frac{3}{4}$  N., steered through the channel, passing a mile to the northward of Salingsingan: when past that island its centre must not be brought to the eastward of E. by S.  $\frac{1}{2}$  S., until Balábac peak bears N.N.W. in order to keep clear of Loxdale shoal, nor to the southward of S.E. until Lumbucan bears North in order to avoid Great Danger bank.

**RAY BANK**, composed of sand and coral, is a mile long E. by N.  $\frac{1}{2}$  N. and W. by S.  $\frac{1}{2}$  S., and half a mile broad, the least water being 4 fathoms near the centre; this bank lies about  $4\frac{1}{2}$  miles eastward of the N.W. shoals on Great Danger bank, and from its western extreme Balábac peak bears N. by W.  $\frac{5}{8}$  W., Lumbucan island N.N.E.  $\frac{1}{2}$  E., and North Mangsee S.E.  $\frac{1}{2}$  E.; the last two islands are too far off, however, to be seen from the deck of a small vessel, but can be clearly made out from aloft. Between this bank and N.W. shoals the soundings are 20 to 29 fathoms; around it are 15 to 17 fathoms, increasing to 37 and 40 fathoms a short distance to the westward.

**ELLIS SHOAL**, situated 3 miles north-eastward of Ray bank, is composed of coral,  $2\frac{1}{2}$  miles long in an E.  $\frac{3}{4}$  N. and W.  $\frac{3}{4}$  S. direction, and half a mile broad; the western part, having 9 to 6 fathoms water over it, and the eastern  $2\frac{3}{4}$  and 3 fathoms: from the west extreme of the shoal part Balábac peak bears N.N.W.  $\frac{3}{4}$  W., and the centre of Lumbucan N.N.E.  $\frac{1}{2}$  E.

**SIMANÁHAN REEF and CHANNEL**.—Simanáhan reef, about  $1\frac{3}{4}$  miles northward of North patches on Great Danger bank, is situated near the centre of a coral bank 5 miles long, E.  $\frac{1}{2}$  N. and W.  $\frac{1}{2}$  S. and three-quarters of a mile broad. The part, dry at low water, has a sand bank near its centre which is just below the surface at high water; this serves, even when covered, from the light colour of the water over it, to point out the position of the reef from a considerable distance. The shoal part of the bank, under a depth of 3 fathoms, encompassing the reef, is about  $2\frac{1}{2}$  miles in extent, and eastward of it soundings of 5 to 9 fathoms, extend to the extreme of the bank in that direction, but westward of it the depths are  $3\frac{1}{4}$  to 4 fathoms: from the west extreme of the bank the centre of Lumbucan bears N.N.W.  $\frac{3}{4}$  W.  $5\frac{3}{4}$  miles, and Steep-fall range, on Balábac island, W. by N.  $\frac{3}{4}$  N.  $15\frac{1}{2}$  miles.

**The Channel** between Great Danger bank and Simanáhan reef is apparently free from danger with soundings of 24 to 30 fathoms: all that

is necessary for its safe navigation is to pass about three-quarters of a mile to the southward of the reef on an East or West course, but occasion can very seldom arise to render this a convenient channel to proceed by.

**Doorly Patches** are several small coral banks, the centre of which lies N.N.E.  $\frac{1}{2}$  E.,  $3\frac{1}{2}$  miles from the centre of Simanáhan sand-bank; the general depths over these patches are 7 to 10 fathoms,  $6\frac{1}{2}$  fathoms being the least water known.

**LUMBUCAN DANGER BANK**, situated  $10\frac{1}{2}$  miles E.  $\frac{3}{4}$  N. from the south extreme of Balábac island, is  $5\frac{1}{2}$  miles long N.E. by E. and S.W. by W., and  $2\frac{3}{4}$  miles broad; this bank comprises Lumbucan island, with its surrounding dangers, also some isolated shoals southward and north-eastward of it. From the south-west extreme of Lumbucan Danger bank, Balábac peak bears N.W.  $\frac{1}{2}$  W., Comeeran island N. by E.  $\frac{1}{2}$  E., and the north point of Lumbucan island N.E.  $\frac{1}{2}$  E.

**Lumbucan Island**, about 100 feet high, is small and wooded, the trees gradually rising from the centre; this island is surrounded by a reef, and shoal water under a depth of 3 fathoms extends  $1\frac{1}{2}$  miles south-westward, and over a mile north-eastward from it, with shoals of  $3\frac{1}{4}$  to 5 fathoms, having 12 to 14 fathoms between, extending more than a mile farther in the same direction. From the centre of Lumbucan island, Balábac peak bears N.W. by W.  $\frac{1}{4}$  W.  $11\frac{1}{2}$  miles.

**South Shoal**, situated  $1\frac{1}{4}$  miles south of Lumbucan island, is half a mile in extent, with 10 to 18 feet water over it, and 6 to 11 fathoms close around. In consequence of this shoal, and of the dangers extending from Lumbucan, that island should be given a berth of at least 2 miles when passing through Lumbucan channel.

**N.E. Shoals**, with 10 to 18 feet water, lie a mile north-eastward of the dangers encompassing Lumbucan island; these shoals extend over a space 4 or 5 miles in circumference, and from their outer edge the centre of Lumbucan island bears S.W.  $\frac{1}{2}$  W.,  $3\frac{1}{2}$  miles, Balábac peak E. by N.  $\frac{3}{8}$  N., and Comeeran island N.E.  $\frac{1}{2}$  N. 4 miles. It is possible to pass between N.E. shoals, and the shoals surrounding Lumbucan island, by bringing Balábac peak to bear W.N.W.; but it should not be attempted except in cases of emergency.

**LUMBUCAN CHANNEL**, limited to the southward by Ellis shoal and Simanáhan reef, and to the northward by Lumbucan Danger bank, is 4 to 5 miles wide and apparently free from danger. Doorly patches divide the channel at its eastern end, the northern passage being 4 miles, and the southern 2 miles wide. The soundings in the fairway at the west entrance quickly decrease from 60 to 40, and 25 fathoms; a bank, with 13 to 16 fathoms over it, lies at the south-west part of the channel, but the depths eastward of this are 23 to 33 fathoms.

If bound to the north-eastward, this is a good channel to use, on account of its capaciousness, and to ensure its safe navigation, it will be only necessary to keep a good look-out for the danger limits, and when near them to attend to the bearings, previously given, of the different objects which point out their extremes.

**COMEERAN DANGER BANK**,  $2\frac{3}{4}$  miles long E.N.E. and W.S.W., and a mile broad, includes within its limits Comeeran island and two shoals.

Comeeran island, 80 feet high, situated N.  $\frac{1}{4}$  E. 5 miles from Lumbucan island, is small, wooded, and surrounded by a reef extending from one to 2 cables from the shore.\*

A shoal, nearly half a mile in extent, with 12 to 18 feet water lies south-westward of Comeeran, its outer edge being distant nearly  $1\frac{1}{4}$  miles; and another shoal, about the same size, having 16 to 18 feet over it, lies a little farther in an easterly direction: close to the outer part of these shoals the soundings are under 10 fathoms; at 2 cables from the south-west shoal there are 28 to 38 fathoms; the same distance off the island 27 fathoms, and off the north-east shoal 17 to 25 fathoms. Balábac peak bearing W.  $\frac{3}{4}$  N. leads southward of all the dangers near Comeeran, and bearing W.  $\frac{1}{4}$  S. northward of them; Lumbucan bearing S. by E.  $\frac{1}{2}$  E. leads westward, and the extreme of the trees on the north part of that island bearing S.S.W. lead eastward of them.

**COMEERAN CHANNEL** is  $3\frac{1}{2}$  miles wide between the dangers surrounding Lumbucan and the south-west shoal off Comeeran island. The soundings in it are 6 to 10 fathoms over coral patches; and a bank, about a mile in extent, lies near the middle on the southern part of which are  $4\frac{3}{4}$  and 5 fathoms (the least water known in the channel) with Balábac peak bearing W. b. N.  $\frac{1}{2}$  N., and Comeran island N.  $\frac{1}{2}$  W. Comeeran channel is not recommended, but it can be used by attention to the bearings, before given, of the extremes of the dangers bounding it.

**Nasubatta Island and Reef.**—Nasubatta island, lying N.N.W.  $\frac{1}{2}$  W.  $7\frac{1}{4}$  miles from Comeeran, is a low cleft rock of sandstone formation, covered with trees, and appearing like two small bushy islets when seen from the north-west and south-east. It lies from 2 to 3 cables inside the northern edge of a reef, dry at low water, which extends three-quarters of a mile S.W.,  $1\frac{1}{2}$  miles S.S.W., and more than a mile S.E. by S. from the larger islet; close to this shoal are depths of 40 to 50 fathoms, and 70 to 75 fathoms 3 or 4 cables off.

**Roughton Reef** lies to the eastward of Nasubatta reef, separated

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\* Natives from Balábac frequent Coomeran island for the purpose of catching turtle which at times resort here in great numbers.

by a channel  $1\frac{1}{4}$  miles broad, in which the depths are 76 to 129 fathoms no bottom; the reef extends  $2\frac{1}{2}$  miles in a N.E. and S.W. direction, the north-east part being  $1\frac{1}{2}$  miles broad, and the opposite end forming a point. On the north-west side is a sand cay, upon which some bushes have sprung up, whence Balábac peak bears S.W. by W.  $\frac{1}{4}$  W., Comeeran island S.  $\frac{3}{4}$  E., and the larger Nasubatta islet W.  $\frac{3}{4}$  N. The reef is steep-to at most parts, but shoal water extends some distance off the northern edge, and three-quarters of a mile northward of the east point is an isolated spot of  $2\frac{1}{4}$  fathoms; the 10-fathom edge of this shoal water is distant from half a mile to a mile from the dry reef.

**NASUBATTA CHANNEL** is  $4\frac{3}{4}$  miles wide between the edge of the reef surrounding Comeeran and the edge of Roughton reef; irregular soundings, 19 to 45 fathoms, extend from the former about a mile and a half, and near the middle of the channel they suddenly increase to 97, 134, and no bottom at 180 fathoms. It is necessary when navigating this channel to carefully guard against the effects of the strong tides and currents which sweep through it in the direction of North Balábac strait with great velocity.

**Soundings.**—The soundings between the islands above described and the east coast of Balábac, are from 44 to 118 fathoms, the 100 fathoms line being within a mile of the shore.

**Candaráman Island**, situated on a reef,  $3\frac{1}{4}$  miles north-westward of Nasubatta, is a low, flat island,  $1\frac{1}{4}$  miles long, North and South, and three-quarters of a mile broad at its south end, narrowing to a point at the opposite extreme; it is separated from Balábac island, and from a small island lying off the inlet of Candaráman, by a channel rather more than half a mile wide, in which the depths are 80 to 44 fathoms; close along the outer edges of the shore reef encircling the island the depths are 20 to 45 fathoms.

That portion of the reef which extends from 3 to 4 cables from the northern and eastern sides of the Candaraman, and on the edge of which a few detached rocks generally show, forms the south-eastern limit of North Balábac strait.

**NORTH CHANNEL** is  $4\frac{1}{2}$  miles wide between the north end of Nasubatta reef and the south-east part of that extending from Canabungan, and  $5\frac{1}{4}$  miles wide between the shoal water off Roughton reef and the reefs extending  $1\frac{1}{4}$  miles from Byan and Gabung islands.

The soundings in a north-west direction from Nasubatta at the distance of half a mile are 100 fathoms; north-eastward of the reef northward of Roughton reef, they increase from 22 fathoms more gradually, the edge of the 100-fathom line being  $1\frac{3}{4}$  miles distant. The northern edge of the 100-fathom line is 2 miles northward of Nasubatta, and  $2\frac{1}{2}$  miles northward

of Roughton reef, the soundings beyond decreasing suddenly to 40, then gradually to 20 fathoms, and suddenly to 10 fathoms, close to the shoal water extending from the reefs which form the northern limit of the channel.

The only difficulty likely to arise in the navigation of this channel will be caused by the strong tides and currents which run with great velocity during the strength of the monsoons, requiring a strong favourable breeze to enable a sailing vessel to make head-way against them. But no danger is likely to occur from this cause if vessels keep to the northward of the deep water, where they can anchor.

**NORTH BALÁBAC STRAIT** formed on the south by Balábac and Candaraman islands, and on the north by Bancálan, Mantangule, and Canabungan islands, is 11 miles long and about 4 miles wide with 30 to 50 fathoms water.

**Secam** is a low woody island,  $1\frac{1}{4}$  miles long, E.S.E. and W.N.W., and 300 yards wide, situated at the western entrance of North Balábac strait, and separated from cape Disaster by Bate channel,  $1\frac{1}{4}$  miles wide, with 30 to 50 fathoms, and 20 fathoms close to the reef, surrounding the island, which reef extends  $1\frac{1}{2}$  miles from its north-western extreme, having a small patch of coral *débris* near its outer edge, covered only at high water.

Depths under 10 fathoms extend a mile westward of the island, with a 4-fathom patch near the extreme: there are similar depths also extending the same distance outside the north-west extreme of the surrounding reef, the outer end being  $2\frac{1}{4}$  miles distant from Secam.

**Bancálan Island**, lying 5 miles north-eastward of Secam, is 3 miles long, N.W. and S.E.,  $1\frac{3}{4}$  miles broad and has a small tree on its western side. The island, is half encircled by a reef discernible at all times by the light-green water inside the breakers, and which at the north-western extreme extends nearly  $1\frac{3}{4}$  miles from the shore. The reef projects a mile from the south-western extreme of the island, contracting the channel between it and Secam to the width of 3 miles. The sounding between are 19 and 20 fathoms, except in the middle, where there are upwards of 30 and 40 fathoms.

**Mantangule and Canabungan Islands.**— Mantangule island, lying 3 miles south-eastward of Bancálan island, is 5 miles long, E. by S.  $\frac{1}{2}$  S. and W. by N.  $\frac{1}{2}$  N., and  $1\frac{1}{2}$  miles broad. Canabungan island, which lies 2 miles south-westward of Mantangule, is  $1\frac{1}{2}$  miles long N.E. and S.W., and about a third of a mile broad.

Reefs also extend to the westward of Mantangule and Canabungan, the two islands being connected by a bank of sand and coral, on which there are 4 and 5 fathoms in some places.



To the south-westward of Canabungan, between it and Candaráman, is the narrowest part of the channel ( $1\frac{3}{4}$  miles wide), where a strong current is usually setting, and in which the soundings are 50 to 60 fathoms. The edge of the reef on the Candaráman side extends 4 cables from the shore, but only half that distance on the Canabungan side; it is well defined by the light-coloured water, and a few small rocks which just show at high water on the south side of the channel.

**Anchorage** tolerably sheltered from south-west winds may be obtained on the north side of Secam island, in 19 and 20 fathoms water, sand and coral, about three-quarters of a mile from the shore, with the eastern extreme of the island bearing South; the reef to the westward affording protection from the swell.

In blowing weather, a second anchor should be let go in time, as the squalls, which often succeed each other rapidly, are sometimes most violent; and, once off the bank in deep water, a vessel would be awkwardly situated as there is no other anchorage for which she could run; and taking the channel, the only alternative at night, would be attended with risk.

**Tides and Current.**—It is high water at Secam island, full and change, at 10h. 50m. a.m., and low water at 6h. 50m. p.m.; rise 5 feet.\* The flood tide sets to the eastward, and the ebb to the westward; maximum velocity observed,  $2\frac{1}{2}$  knots.

The strength of the current through Balábac strait depends on the prevailing winds. In the months of October and November, after a succession of westerly winds, it was found to set constantly to the eastward, slackening only on the ebb tide; while in July, after a continuance of unusually fine weather with light east and south-east winds, it set with the same velocity, viz., from three-quarters to  $2\frac{1}{2}$  knots in the opposite direction. The mean velocity observed for 13 consecutive hours was  $1\frac{3}{4}$  knots.

**Directions.**—If coming from the southward or westward, do not attempt to approach Balábac island nearer than 12 miles until Balábac peak bears to the southward of S.E. by E.  $\frac{1}{2}$  E.; or until Cliff hill bears East, when Secam island, which will show like a small cluster of trees with a flat summit, may be steered for on an E.N.E. bearing.

If passing through Bate channel, keep a little towards Secam island, to avoid the edge of the reef which extends about three-fourths of a mile from cape Disaster, but on which the sea generally breaks.

From Secam island the channel course is S.E. by E. 6 miles, passing between Candaráman and Canabungan, two low islands, appearing nearly

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\* There is only a tide and a half-tide in the 24 hours, the latter occurring in the day-time in the month of November.

equal in size and elevation; the former having a small island between it and Balábac, and the latter a few *casuarina* trees detached from its northern extremity.

Approaching from the north-westward, Secam will appear like a small round island; and in passing to the northward of it, care should be taken not to approach too near the reef off the north-western extremity, as rocky ground extends three-fourths of a mile from it, where there may be shoaler water than that marked in the chart; namely, 6 and 8 fathoms.

Having passed Secam island about 5 miles, Nasubatta will be seen, distant about 7 or 8 miles, through the channel in the offing to the south-eastward, and soon afterwards Comeeran island nearly in line beyond it.

If bound to Daláwan bay, and a south-west wind, haul close round the reef of Candaráman, and work down between these islands, and the Balábac shore, where there is a safe channel with deep water, but no anchorage.

**Islets near Bancálan.**—Patawan is a small wooded islet lying a mile north-eastward of the easternmost point of Bancálan, with a depth of 8 fathoms between; it is half encircled by a reef which extends 2 cables from its western side.

Patongong islet, lying 3 miles north-eastward of Bancálan, is nearly half a mile in length, North and South, having a reef extending from it  $1\frac{3}{4}$  miles to the westward and north-westward.

Canimeran, lying  $1\frac{3}{4}$  miles north-eastward of Patongong, is a small sandy island with trees; a reef extends 8 cables north-westward of this island.

**Pandannan Island**, situated  $3\frac{1}{2}$  miles north-eastward of Bancálan, is about  $6\frac{1}{2}$  miles long N.E. and S.W., and about  $2\frac{1}{2}$  miles broad. Its southern and western shores are fronted with coral, and off the south-western extreme is a sand-bank, dry at low water.

The features on the north side of Pandannan undergo a change, the land rising a little, on which there are two conspicuous trees. The extremity of the island also terminates in small abrupt heads, more especially at the north-east point, off which there is a small bushy islet, from which a reef extends  $5\frac{1}{4}$  miles in a north-easterly direction, parallel with the coast of Palawan, having 20 and 24 fathoms close to its western edge.

There is, also, an islet on the north-west face of the island, midway between it and Palawan, and East  $2\frac{1}{4}$  miles from Canimeran, from which an extensive reef projects, contracting the channel round the south point of Palawan to three-fourths of a mile, where there are 7 to 9 fathoms, mud.

**Water.**—Fresh water was found in a small opening on the south side of Pandannan island, about  $1\frac{3}{4}$  miles to the eastward of the point; but the supply, besides being scanty, is difficult to obtain, owing to a reef that extends  $1\frac{1}{2}$  miles from the shore, parts of which are dry at low water.

**Bugsuk Island**, 9 miles long, in a North and South direction, and  $4\frac{1}{2}$  miles broad, lies close to the east side of Pandannan, but is separated from it by a long channel only  $3\frac{1}{2}$  cables wide, running nearly North and South, in which there are depths of 10 and 18 fathoms. The southern and eastern sides of Bugsuk are fronted by a reef extending in some parts nearly 2 miles from the shore. The edge is well defined by the light-green water, contrasting strongly with the outside, where the depth is upwards of 30 fathoms.

A long sandy spit, with a few casuarina trees, extends from the south side of Bugsuk, but the only recognizable feature on the island is a clump of trees near the north-east extreme.

**Bowen** is a small round island lying off the north point of Bugsuk having a reef, partly dry at low water, extending  $3\frac{1}{2}$  miles from it in an easterly direction.

**Appo, Gabung, and Byan** are small islands lying in an irregular W.S.W. direction from the south-west point of Bugsuk, with which they are connected by a reef.

**Malinsono Island**, situated  $1\frac{1}{4}$  miles N.N.E. of Mantangule, and connected with it by a coral spit, is small, high, and differs from the rest in character and feature. The ground in the vicinity is foul, and studded with rocky patches nearly awash.

**Channels.**—To the eastward of Bancálan, limited on the north and south by Pandannan and Mantangule, and on the east and south-east by Bugsuk, and the small islands Appo, Gabung, and Byan, is an expanse of water, 8 miles in an East and West, and  $3\frac{1}{2}$  miles in a North and South direction, where in some parts anchorage sheltered from all winds may be found in from 7 to 12 fathoms. The channels into it are, however, intricate, and almost impracticable for sailing vessels, being either close along the edges of the reef, or, where it is wide and inviting, between small detached coral patches, for which it is impossible to give any specific directions. The best channel, if they admit of a choice, appears to be to the northward of Bancálan, between the reef which extends from that island and one that extends  $1\frac{1}{4}$  miles to the north-westward of Patongong. This channel between the reefs is  $1\frac{1}{2}$  miles wide; but a 3-fathom coral patch lying in the centre, just within the entrance, contracts it to half that distance.

To sail through the channel, sight the edge of Bancálan reef, which is always well defined, and keep half a mile off until the western extreme of the island bears S. by W.  $\frac{1}{2}$  W., to clear a small 3-fathom knoll detached 3 cables from it; then close the reef immediately, to avoid the central patch, and keep from 2 to 3 cables off, steering for the small wooded islet Patawan, off Bancálan, in line with the north extreme of Malinsono.

Do not approach the Bancálan shore within 3 cables; and during the south-west monsoon, anchorage may be obtained between it and Patawan in 8 or 9 fathoms, sandy bottom, with the latter island bearing about E.S.E. In the north-east monsoon, the best anchorage is to the south-eastward of Patawan, in 9 and 10 fathoms, taking care to pass between it and Bancálan, as the ground to the eastward is foul.

There is a passage to the eastward of Canimeran island, which under some circumstances may be preferable to, and probably be found less intricate than that just described. It must, however, be borne in mind, that in navigating these channels, much depends on a good look-out; for the edges of the reef are generally well defined, and any danger will, under ordinary circumstances, be detected.

The channel between Bancálan and Mantangule is  $2\frac{1}{4}$  miles wide; but rocky ground, with numerous shoals, extend from the shore of the latter island nearly across the entrance.

The only channel to the south-east is between Mantangule and Byan island. This channel, through which a strong current usually sets, is three-fourths of a mile wide, and has 11 and 12 fathoms in it, with reefs extending to the southward from either shore at the entrance.

## CHAPTER IX.

## WESTERN PHILIPPINE ISLANDS.

## WEST COAST OF PALAWAN ISLAND.—CAPE BULILUYAN TO ULUGAN BAY.

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 VARIATION  $1^{\circ} 2'$  East in 1879.
 

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**CAPE BULILUYAN**, the southern point of Palawan island, is a low shelving coast fronted by mangroves, having on its south side depths of 4 to 8 fathoms close to the shore, and on the eastern side,—between it and the north head of Pandanan island, where the channel is 8 cables wide,—from 28 to 30 fathoms. The western side is fronted by a reef, which is dry at low water, and extends from 3 to 5 cables from the shore, with 6 and 7 fathoms, mud, close to the edge.\*

**Coral Patches.**—At 2 miles to the westward of cape Buliluyan, and the same distance northward of the small bushy island of Canimeran is a coral patch three-quarters of a mile in extent, in a S.E. and N.W. direction, with 2 and 4 fathoms on it, the soundings in the neighbourhood being 28 and 30 fathoms. North, a little westerly, 3 miles from the above and  $2\frac{3}{4}$  miles from the shore is another patch with the same depth, half a mile in extent, from the centre of which the body of Cappyas island, a little open north of S.W. hill bears N.E.  $\frac{3}{4}$  E., and the southern extreme of Palawan, S.E.  $\frac{3}{4}$  S. southerly.

Off Welcome point,  $3\frac{3}{4}$  miles to the northward of cape Buliluyan, rocky ground, with 2 and 3 fathoms on it, extends about  $1\frac{3}{4}$  miles from the shore; and if the *Regent's* bearings be correct, it was on this spot that a vessel of that name was wrecked in October 1822.

**Cappyas**, a small low woody island, lying 6 miles to the northward of cape Buliluyan, and one mile off shore, has a channel inside with 6 and 9 fathoms, and a reef extending 4 cables to the northward of it. The south side of the island is steep-to.

Rocky ground also extends  $2\frac{1}{2}$  miles to the westward of Cappyas, where there are only 12 feet in some places, with 25 and 30 fathoms close to the outer edge, and 7 and 15 fathoms between the patches inshore of it.

At  $1\frac{1}{2}$  miles north of Cappyas a spit projects from Repose point, having on it a dry sand patch  $1\frac{1}{4}$  miles from the shore. Foul ground extends nearly 2 miles beyond this, with soundings varying from  $2\frac{1}{2}$  to 5 and 13 fathoms.

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\* See Admiralty chart :—Palawan island, No. 967; scale,  $m=0.1$  of an inch.

**ALIMUDEEN POINT**, N. by E.  $\frac{3}{4}$  E. distant  $8\frac{1}{2}$  miles from Cappyas, is a small wooded promontory, which forms the southern extremity of Caneepaan bay. The intermediate coast is chiefly low mangrove, indented with bays, and lined with reefs which dry at low water, and extend from 3 to 7 cables from the shore, having 10 and 12 fathoms water close to their edges.

**S.W. or Triple Hill**.—A low range of hills, commencing abreast of Cappyas, lies parallel with the coast, about  $1\frac{1}{2}$  miles inshore, of which S.W. hill, with a small triple summit 900 feet above the sea, is the highest and most conspicuous. At the northern extremity of this range there is a hill named West Coast hill.

**South Regent Shoal**, which appears to be the westernmost of the inner dangers, is a patch of sand and coral, upwards of half a mile in extent, north and south, with 8 feet water near its north extreme, and 13 to 14 fathoms close around. It lies nearly midway on the bank,  $7\frac{1}{2}$  miles from the shore, and  $5\frac{1}{2}$  miles south of the North Regent shoal (p. 282). From its shoalest part the southern extreme of Palawan bears S.S.E.  $\frac{1}{4}$  E.; S.W. hill E. by S.  $\frac{3}{4}$  S.; Caneepaan hill E.N.E.: and the summit of Bulanhow in line with Alimudeen point E. by N.  $\frac{1}{3}$  N.

On the latter bearing,  $2\frac{1}{4}$  miles inshore of this reef, there are two other patches, each 3 cables in extent, with 9 and 12 feet water; they lie 3 cables apart, and have 10 fathoms between them.

**Kamonga Shoal**, situated E. by S.  $\frac{3}{4}$  S.  $3\frac{3}{4}$  miles from the South Regent shoal, is a 2-fathoms patch 3 cables in extent, from which the southern slope of Bulanhow, bisecting the summit of Sagee hill, bears E. by N., and Alimudeen point, a little open to the southward of Caneepaan hill, N.E.  $\frac{3}{4}$  E. Midway between this shoal and Repose point is a rock nearly awash.

The depths in the vicinity of these shoals vary from 30 to 35 fathoms mud, decreasing to 18 and 20 near the shore, with occasional patches of 4 and 5 fathoms, coral.

**CANEEPAAN BAY**.—Cape Seeacle,  $2\frac{1}{4}$  miles N.N.E. of Alimudeen point, is a wooded promontory higher than that of Alimudeen, forming the north extremity of Caneepaan bay, with a small but conspicuous tree on the flat part of its summit. In the centre of a sandy beach to the southward of this, the Caneepaan river disembogues. It is navigable for boats 2 miles, where, on some rising ground on the left bank, is a Malay village, which, in 1850, contained a population of about 200, presided over by a Datoo.

There is only one foot depth at low water over the reef at the entrance of the river. The shore of the bay is lined with coral, which in the south-west corner dries a mile off. There are also rocky patches, with 2 to 5 fathoms,

lying  $1\frac{1}{2}$  miles north-west of Alimudeen point, and one with 3 fathoms N.W.  $\frac{3}{4}$  N.  $1\frac{1}{4}$  miles from cape Seeacle.

**Seemagoup Bay**, on the north side of cape Seeacle, is a small bay, with reefs drying nearly across the entrance, and a rocky spit extending about a mile from Coreti point, its north extreme.

**Caneepaan Hill**, 976 feet high, on the eastern shore of Seemagoup bay, and N. by E.  $\frac{1}{2}$  E. from S.W. hill, is steep and conical, with two summits when seen from the north-westward, the southern being the sharper of the two. Next to the Bulanhow range, Caneepaan hill is the highest and most conspicuous object on this part of the coast.

**BULANHOW MOUNTAIN.**—To the eastward of Caneepaan hill, and nearly in the centre of the island (which is here about 13 miles across), the high land of Bulanhow rises, attaining an elevation of about 3,500 feet above the level of the sea. It is of a reddish aspect, rising gradually on the south from a range of hills behind Caneepaan; it has a long smooth summit, of which it is difficult to distinguish the highest part. The northern slope has several small sharp peaks with steep shoulders and ravines, amongst the most conspicuous of which is Low-hock, or Low Sharp Bulanhow, generally showing when the adjacent hills are obscured.

**Se-pan-gow Bay**, situated  $5\frac{1}{2}$  miles N.E. from cape Seeacle, has apparently two deep inlets, with Cliff point, a small red cliff, to the northward, and two green islets lying near each other immediately under Steep hill, the shoulder of a coast-range to the southward. There are 8 and 9 fathoms at the entrance of the bay, but when well within the points, the mud dries across it.

**Water.**—At  $3\frac{3}{4}$  miles N.E. from Cliff point is Rock point, a long bluff head, with a small rock lying off it. To the southward of this point is a sandy bay, the shore of which is lined with casuarina trees, where, at the western extremity near Pine point, there is a good flow of fresh water. Water can also be obtained from the Coloby rivulet, a mile to the southward of Pine point where there are  $4\frac{1}{2}$  fathoms close to the beach.

Off Pine point, and also between it and Rock point, reefs dry nearly three-quarters of a mile from the shore; 6 cables beyond which are two patches of 3 and 4 fathoms, coral, with 12 and 15 fathoms inside them.

**PERIGEE BANK.**—The coast between cape Seeacle and Cliff point is dangerous to approach, as rocky uneven ground, with many shoal patches, extends in some places  $2\frac{1}{2}$  miles from the shore. The largest of these patches is the Perigee with  $2\frac{1}{4}$  fathoms over it, on which the sea breaks in blowing weather, lying to the westward of Se-pan-gow bay, and N.W. by W.  $2\frac{1}{4}$  miles from Providence point. It is about a mile in extent, parallel with the coast, and has 23 fathoms a cable from its

western edge. From its south-western extremity cape Seeacle bears S.  $\frac{1}{2}$  W.; Cancepaan hill, S.S.E.  $\frac{1}{2}$  E.; Balansungain peak, N.E. by E.  $\frac{3}{4}$  E.; and Rock point, the western extreme point of the range, N.E. by E.

**Coloby Patch**, situated N.N.E.  $3\frac{1}{4}$  miles from the south-western extremity of the Perigee bank, and N.W.  $\frac{1}{4}$  N.  $4\frac{1}{2}$  miles from Cliff point is 2 cables in extent, with 15 feet water, and 22 and 25 fathoms in its immediate vicinity. It lies with cape Seeacle bearing S. by W.  $\frac{1}{4}$  W., and Balansungain island (showing as a small flat island, with a peak in the centre), seen clear of Pine point, E. by N. northerly. The soundings between this shoal and the Perigee bank are 23 fathoms, coarse sand, and those inshore of it 19 fathoms. There is an 8-fathoms patch S.  $\frac{3}{4}$  E. 8 cables, and a 6-fathoms patch N.E.  $1\frac{1}{4}$  miles from the Coloby.

**ANTELOPE SHOAL**, situated W.  $\frac{1}{2}$  N.  $3\frac{1}{2}$  miles from Coloby patch, and N.E.  $\frac{1}{4}$  N.  $5\frac{1}{4}$  miles from Breaker reef (page 282), is the largest of the Antelope cluster. It is a narrow strip of sand and coral, 7 cables in extent in a N.E. and S.W. direction, on which there are only  $2\frac{1}{2}$  fathoms water, with 30 and 35 fathoms on either side. From its centre Balansungain island bears E.  $\frac{1}{4}$  N.; Steep hill, in Se-pan-gow bay, S.E.  $\frac{1}{2}$  E.; Cancepaan hill, S.S.E.  $\frac{1}{2}$  E.; and Cliff point (if seen) will be in line with Low Sharp Bulanhow (Low-hock), S.E. by E.  $\frac{1}{2}$  E. Antelope shoal lies 6 miles from the shore, and there are 30 fathoms, green mud, between it and the Coloby patch.

At  $1\frac{3}{4}$  miles S.W. by W.  $\frac{3}{4}$  W. from the centre of this shoal, is a 3 fathom coral patch; and there is also another, 3 cables in extent, with 3 and 4 fathoms N. by W.  $\frac{1}{2}$  W. about  $1\frac{1}{2}$  miles from it, with 30 fathoms immediately off the western edge. One mile N.E. by E.  $\frac{1}{2}$  E. from the shoal, is a bank of sand and coral, 4 cables in extent, with only 12 feet of water on it, and a smaller patch with the same depth three-quarters of a mile North of the latter.

**N.E. Antelope Shoal**, the north-easternmost of the Antelope cluster, situated N.E. easterly,  $2\frac{3}{4}$  miles from Antelope shoal, is 3 cables in extent, not less than 3 fathoms were found upon it, and 31 fathoms close to its outer edge. From this shoal the summit of the Pagoda is just seen over the shoulder of I-wi-ig range, in line with the flat Balansungain island, bearing E. by S.  $\frac{1}{4}$  S.; Cancepaan hill, S. by E.; and the promontory of cape Seeacle about South (with the conspicuous tree on its table summit, showing well in this direction), appearing midway between West Coast hill and S.W. hill.

The lead does not give the slightest indication when in the proximity of these shoals, but they can generally be discovered from the masthead. The



soundings in their vicinity vary from 26 to 30 and 35 fathoms, mud, with 37 to 46 fathoms, mud, 3 miles to the westward of them.

Large quantities of sea-weed, resembling the Sargasso, are frequently seen in this neighbourhood.

**MARASI BAY.**—From Rock point the coast trends to the eastward 4 miles, forming Marasi bay, off the north point of which and distant 6 cables, is a small bushy islet named Leeta-Leeta, connected with the shore by a reef which also extends the same distance northward of it.

**Balansungain Peak.**—From Rock point a low ridge extends along the south shore of Marasi bay, on which is Balansungain peak, 947 feet high, and which, when first seen from the southward, is conspicuous from being so sharp.

**I-wi-ig Range.**—At the back of the above ridge, fronting Bulanhow and lying parallel with the coast, is a higher range, named I-wi-ig, with a double hill in the centre, 1,814 feet above the sea, from which a table shoulder extends; the range then gradually slopes towards some low hills on the plain to the northward, overlooking the eastern shore of Marasi bay.

**Balansungain Islands.**—In the south-western part of Marasi bay, a mile from Rock point, are two islands of sandstone formation, named Balansungain, lying 3 to 5 cables from the shore; the westernmost (which is flat) being nearly connected with it by a spit which dries at low water. Reefs, which always show, extend from both extremities of these islands parallel with the shore; and in the bay there are several coral patches, with small sand-banks dry at low water.

Rocky ground extends  $1\frac{1}{2}$  miles in a N.N.W. direction from the Balansungain islands, having in some places only 3 fathoms water, with 19 fathoms close to; also  $1\frac{3}{4}$  miles North of the flat island, and W.  $\frac{1}{4}$  N.  $2\frac{1}{4}$  miles from Leeta-Leeta islet, is a small patch of 4 fathoms, with 18 fathoms, mud, around it. Foul ground more or less extends from this to the bottom of the bay.

There are also two other rocky patches, lying respectively N.W.  $\frac{1}{4}$  N. and N.W. by W. 3 miles from the flat Balansungain island, and N.N.E.  $\frac{1}{4}$  E. from cape Seeacle. They are each half a mile in extent, and have 4 and 5 fathoms, with soundings of 20 fathoms between, and 28 and 30 fathoms to the westward of them.

The distance from Marasi bay to Rocky bay on the opposite shore of the island is 10 miles.

**Pagoda Cliff (Ta-go-ra-ras),** situated N.E.  $\frac{1}{4}$  E.  $10\frac{1}{2}$  miles from the summit of Bulanhow, and  $5\frac{1}{2}$  miles inland of Marasi bay, is a remarkable limestone cliff, 2,000 feet above the level of the sea, having a table summit

with two clefts, which form pinnacles at either extremity; the southern pinnacle being the sharper; there is a small rock in the gap, conspicuous on a N.W. and S.E. bearing. Pagoda cliff rises immediately above a plain which extends across the island, separating the Bulanhow and Mantaleengahan ranges, being connected with the latter by a high ridge with various summits of similar character and formation, among the most conspicuous of which are the Hat or Panalingahan; the Fin, a very sharp pinnacle; and three sharp hills under the fall of Mantaleengahan.

**MANTALEENGAHAN MOUNTAIN**, 6,843 feet high, is of a reddish barren aspect, and when viewed from the westward has a table summit, the north end being the highest part; while a long smooth shoulder, terminating in three small nipples, slopes gradually to the southward. It has several spurs and lower ranges fronting it, the most remarkable of which is Sal-le-kan, a sharp peak 2,814 feet high,  $5\frac{1}{2}$  miles to the northward.

**Lan-dar-gun and Gantung Peaks.**—From Mantaleengahan mountain a high central range extends in a north-easterly direction to the parallel of  $9^{\circ} 10' N.$ , having on it several remarkable peaks, the two highest of which are Lan-dar-gun, 5,397 feet; and Gantung, 5,868 feet above the level of the sea. Towards the termination of this range there is a table hill with a sharp nipple, named Cal-li-bu-gon, 1,793 feet; and at the extremity,  $2\frac{1}{2}$  miles farther to the north-eastward, is Corumi, a conical hill of less elevation, with a slip on the north side near the summit.

**The COAST** from Leeta-Leeta islet trends to the north-eastward  $13\frac{1}{2}$  miles to Pampangduyang point; it is low, and has small bays, in some of which there are rivulets of fresh water.

For 5 miles, as far as Washington head, the coast is fronted by a reef which extends from three-quarters to  $1\frac{1}{2}$  miles off shore, having openings here and there with 3 and 6 fathoms water in them; after which only the points of the bays have spits projecting from them, extending 3 to 5 cables off, with 5 and 6 fathoms close to the edge; the soundings in the bays gradually decrease to 2 fathoms, mud, close to the beach.

**Illaan Hill**, frequently a useful object on this part of the coast, from the high land being obscured, is a detached hill, 600 feet high, and covered with wood, lying a mile from the coast behind Townsend point, and S.  $\frac{1}{2}$  W.  $2\frac{1}{2}$  miles from Pampangduyang point. There is a low table hill  $1\frac{1}{4}$  miles north-eastward, and a conical hill the same distance south-westward of it; the latter apparently being connected with it by ridges which extend along the coast close to Jervois point. There are also several other low densely wooded hills on the plain, not however sufficiently conspicuous to be of service to the navigator.

**Water.**—At  $1\frac{1}{2}$  miles southward of Pampangduyang point, in the bight of a small bay, is a rivulet, from which in favourable weather a supply of good water may be obtained, the entrance being protected by a coral spit. Care is required in approaching, as foul ground with shoal water extends  $1\frac{3}{4}$  miles in a northerly, and one mile in a westerly direction from Pampangduyang point, with 12 fathoms, mud, immediately beyond it.

**Five-fathoms Patches.**—At 4 miles N. by W.  $\frac{3}{4}$  W. from Washington head, and W.  $\frac{1}{4}$  N. from Illaan hill, is a 5-fathoms patch 4 cables in extent, lying  $3\frac{1}{4}$  miles from the shore, with a patch on which the sea breaks at low water  $2\frac{1}{4}$  miles to the south-eastward of it; the latter lying  $1\frac{1}{4}$  miles West of Jervois point. The soundings between the two are 16 fathoms.

**Caution.**—Vessels should not approach this part of the coast within 3 miles; the lead gives no warning when near a reef, and the water is not always sufficiently clear to see the danger. The soundings from 3 to 5 miles off shore vary from 15 fathoms to 17 and 25 fathoms, muddy bottom, with occasional patches of sand or coral.

**The COAST** from Pampangduyang point trends in a north-easterly direction  $11\frac{1}{2}$  miles to Eran point, which, as well as the intermediate land, is low, densely wooded, and fronted by reefs drying from 4 to 5, and in some parts, 7 cables from the shore. At  $1\frac{1}{2}$  miles eastward of the former point is a sandy bay, where there is a rivulet of good water. The shore of this bay for a distance of nearly  $1\frac{1}{2}$  miles appears free from reefs; patches of sand and coral, however, nearly dry, with 3 and 4 fathoms inside them, lie half a mile off its entrance.

**Eran Quoin**, 518 feet high, a quoin-shaped hill, named by the natives Pa-le-pie-kan stands on the plain midway between Low and Eran points.

**The Soundings** off this part of the coast are generally more regular than those to the southward, and, with the exception of a few 6 or 8 fathoms patches, gradually increase from 7 and 9 fathoms, near the reef, to 30 fathoms, mud, 6 miles from the shore. There is a small 3-fathoms patch lying westward of Eran point, and three-quarters of a mile off Becher point. From this patch Becher point is in line with Eran Quoin, bearing S.  $\frac{3}{4}$  E.

**ERAN BAY**, situated immediately eastward of Eran point, may be readily recognised by Eran Quoin; it is the first bay on the coast from the southward, which affords anchorage in south-west winds, and where wood, water, and supplies can be obtained.

Gantung mountain, 5,868 feet high, and False Sharp peak (the latter likely to be mistaken when first seen for Sharp or Sal-le-kan peak, 2,814

feet) farther south, overlook this bay, the spurs from which approach very near the coast.

Between the two is Waterfall peak, (an abrupt rocky shoulder worn bare by the action of the water usually seen running down the side,) the commencement of another range lying parallel to that of Gantung, and which from the identity of the features near the northern extremity, is designated False Corumi.

Eran bay is 4 miles wide at the entrance, 2 miles deep, and open to the northward; at the head of the bay there is a projection named Truce head, off which, and connected with it at low water, is a small sandy islet named Bivouac. From this islet the reef extends in a northerly direction three-quarters of a mile, with its extremity bearing East 2 miles from Eran point. At  $1\frac{1}{2}$  miles S. by E. from this point, in the south-west corner of the bay, is the entrance of Eran river, which, under ordinary circumstances, boats can enter, and obtain a supply of good water without going very far up. There are one or two rivulets of fresh water, named by the natives Eetloose, to the eastward of Truce head; but in this part of the bay there is a great deal of coral and foul ground.

The population of this and the neighbouring district, at the period of the *Royalist's* visit, was said to be about 750, chiefly Dusuns, or hill people, with a mixture of Malays, the head of whom styled himself Pangeeran. They collected beeswax, and cultivated small tracts of land; but they were exceedingly jealous of the officers employed on the survey going into the interior, and negatived all proposals to visit their village. They professed to be very poor, and said they had much difficulty, from the bad nature of the soil, in getting the land to yield a good crop.

**Supplies.**—The people were shy at first; but upon seeing a disposition to be friendly, they soon brought fowls, goats, sweet potatoes, &c., down to the beach to barter; in exchange for which they preferred articles of clothing, hardware, bottles, &c., to money. The dollar, either Spanish or Mexican, is the current coin on this coast. The beach at the entrance of the river is convenient for seining.

**Anchorage.**—The best anchorage in Eran bay is eastward of Eran point, a mile from the shore, in  $6\frac{1}{2}$  or 7 fathoms, stiff mud, with Eran Quoin bearing S.W.  $\frac{1}{2}$  W., and Bivouac islet, S.E. by E. midway between it and the reef off Bivouac islet, or closer up if necessary; recollecting, however, that as the beach is approached, the bay becomes contracted by reefs, which on the western shore gradually extend from 2 cables off Eran point to half a mile westward of Bivouac islet. Vessels should not anchor in any part of the bay east of Bivouac islet, as reefs, with off-lying patches, project some distance from the shore; and a heavy rolling swell occasionally sets in.

**Tides.**—It is high water, full and change, in Eran bay, at 10 h. 10 m. springs rise  $6\frac{1}{4}$  feet. There is a tide and half-tide in the 24 hours; the latter occurring (in the month of June) in the daytime, when the difference of level is only 5 or 6 inches.

**The COAST** northward of Eran bay trends N.N.E. about 4 miles to Elizabeth point; thence N.E. by E.  $9\frac{1}{4}$  miles to Hummock point. It is similar in character to the coast southward of Eran point, having low abrupt points, from which reefs, dry at low water, project 3 to 4 cables. The bights of the bays formed by these points, in some of which there are streams of fresh water, are usually free from coral, and have 2 and 3 fathoms close to the beach.

**Mountains and Hills.**—**Pu-Lute Range**, which is about  $7\frac{1}{2}$  miles in-shore, is 3,067 feet high, with a deep saddle to the southward, and a high and a low sharp nipple, the former 2,930 feet in height, on the slope to the northward. Between this and the coast-range there are other hills of less elevation, the most conspicuous being a dark conical hill lying north-westward of the former.

There is also another elevation named Point hill, 560 feet above the sea, immediately over Hummock point, from which a low range extends along the coast 5 miles in a south-westerly direction, parallel with the shore, terminating in a triple-top hill. On the plain to the south-westward of this range is a high wooded mound, with a conspicuous tree on the summit, between which and False Sharp peak over Eran bay, and fronting the Corumi range, are other hills of nearly equal elevation, the most remarkable being a long saddle hill of dark aspect, with one similar to it, but lower and nearer to the coast, named Low Long Saddle.

**Malapakkun and Marantao Islands.**—At 3 miles W. by S. of Hummock point, and  $1\frac{1}{4}$  miles off shore, is Malapakkun, a wooded island 340 feet high, with a small double summit, and a round islet lying 2 cables to the southward of it. There is a channel inshore with 9 and 10 fathoms, but it is not recommended, as fringing reefs, projecting from 4 to 7 and 8 cables, extend along the neighbouring coast, increasing in distance from the shore towards Hummock point, and inclosing a small island named Marantao, 247 feet high, lying off the coast one mile westward of the point.

**CAUTION.**—Vessels approaching the coast immediately to the northward of Eran bay, should not shut Malapakkun island in with Elizabeth point, as the ground is foul in that vicinity; nor should any part of the coast between it and Malapakkun be approached nearer than 2 miles, as doubtless other patches exist, besides those which have been discovered.

The *Royalist* struck upon one of these when  $1\frac{1}{2}$  miles N.N.W. of Elizabeth point, with the right extreme of Malapakkun island a tangent

with the left extreme of Marantao N.E. by E. It is a pinnacle rock, and probably would not have been discovered, except under similar circumstances, as the leadsman in either chains could not get less than  $4\frac{1}{2}$  and 5 fathoms when the vessel was on it.

Beyond the distance of 2 miles from the shore, the soundings vary from 15 to 25 fathoms mud, with patches of 5 and 7 fathoms, coral, occasionally.

**Triple-Top Island**, situated N.E.  $\frac{1}{4}$  E.  $4\frac{1}{2}$  miles from Marantao, and N.W. nearly 3 miles from Albion head, is the outermost of several islands lying from 2 to 4 miles eastward of Hummock point. It is somewhat flat, with three summits (the highest being 162 feet above the sea), and a pinnacle rock at its northern extremity. A reef extends one cable from the south-west side of Triple-top, where there are two detached rocks; and N.E. nearly three-quarters of a mile from the highest part of the island, is a 5-fathoms patch of coral, with 12 and 15 fathoms, mud, around it.

**Mangrove, Grass, and Nakoda Islands.**—At  $2\frac{1}{4}$  miles eastward of Hummock point, there is an indentation in the coast, off which, and connected with it by reefs, are Mangrove and Grass islands, two low mangrove islands, each about three-quarters of a mile in extent, the outer or northern one having Nakoda, a high island, with a conical head at the extremity, attached to it on the north-east side. From this head a reef, dry in some places, extends to the westward along the face of Nakoda and Grass islands, the extreme edge of which is a mile from the shore, with 14 fathoms close to. The north extreme of Nakoda island in line with the south point of Grave island bearing E. by S.  $\frac{1}{4}$  S. just clears it. Reefs also extend to the westward of Grass and Mangrove islands blocking up the channel between them and Hummock point.

**Grave Island** is nearly one mile S.E. of Triple-top island, having in the channel between depths of 11 fathoms. Grave island is a mile long, the highest part, 280 feet above the sea, being near the northern extremity. The southern extremity of the island, is a low sandy tongue, one mile distant from the nearest part of Albion head. It has some small detached rocks on the northern face; a reef projects nearly one quarter of a mile from the western shore, and a reef, projecting from 2 to 4 cables, fronts the eastern shore, with 9 and 10 fathoms water close to the edge.

**Anchorage.**—In Nakoda cove which is formed by Grass, Nakoda, and Grave islands, anchorage may be obtained in 4 fathoms, tolerably sheltered in either monsoon, care being taken not to go too far in, as the edge of the coral lining the bay lies three-quarters of a mile from the shore in the southern part, where there is a green conical head. The reef pro-

jecting from the western side of Grave island, narrows the channel between it and Nakoda island (the entrance of the cove) to half a mile in width, in which there are 9 fathoms, mud.

**TAY-BAY-U BAY.**—Albion head, bearing E. by N.  $4\frac{1}{2}$  miles from Hummock point, is a bold perpendicular limestone cliff, with stalactite caves, luxuriantly wooded, and having several summits of nearly equal elevation, the highest being 690 feet above the sea. It is the extremity of a point projecting in a north-easterly direction, and forming the western shore of Tay-bay-u bay. Immediately south of the head, are two hills, different from it in character and feature.

Tay-bay-u bay affords shelter in either monsoon, being protected on the west by Albion head, and on the north by a low flat island, surrounded by reefs. It is, however, difficult of access, and ought not to be attempted by vessels without local knowledge.

**Ma-la-nut Range**, situated on the southern side of Tay-bay-u bay, is 1,630 feet above the sea, and extends to the south-eastward, two-thirds of the way across the island, where it terminates in the conical mound Ma-la-nut, 1,290 feet above the sea, but not so high in appearance.

On the north slope over the village of Ma-la-nut there are some cleared green spots, and viewing the range end on, in a N.W. or S.E. direction, it assumes the form of a precipitous cliff, with steps on its south side.

North of the Ma-la-nut range there is another distinct separation in the hills by the plain stretching across the island, a distance of 10 miles from coast to coast.

**Ma-la-nut River.**—The shore of Tay-bay-u bay is fronted with mangrove, and in the south-eastern part, at the western extremity of a sand-beach, the Ma-la-nut river disembogues, where fresh water may be procured with tolerable facility when the river is swollen; but in the dry season it is difficult for boats to proceed any distance up, from the rocky nature of the bed; added to which, an extensive flat dries at low water off the entrance. Considerable difficulty was experienced in watering here.

About  $1\frac{1}{2}$  miles up this river there is a landing-place on the right bank, which leads into an open tract of country extensively cultivated, where there are a few houses, occupied principally by Illanuns, the chief of whom styles himself Sultan of Ma-la-nut, and exercises almost absolute control over a population of about 3,000 souls. They are in communication with the people of Eran and Caneepaan, and also with other Malay establishments on the east coast of the island.

**Supplies.**—Goats, fowls, yams, and vegetables of various kinds were procured, for which the natives were willing to take cloth, crockery,

and other articles in exchange; and they would stack firewood on the beach (but *would not* embark it) at the rate of one dollar for 100 billets, the average size of each being about 2 feet long and 4 inches thick.

**Dangers in the Entrance.**—The channel into Tay-bay-u bay is formed by Triple-top island, Grave island, and Albion head on the west; and Low Flat island on the east. The latter island lies about a mile north-eastward of Albion head, and is nearly three-quarters of a mile in extent, N. by W.  $\frac{1}{2}$  W. and S. by E.  $\frac{1}{2}$  E. The reef surrounding this island projects from the shore nearly 2 miles in a north-westerly direction, and 4 cables to the south-westward, the latter narrowing the channel between it and Albion head to three-quarters of a mile, in which the depths are 5 and 6 fathoms, mud. Albion head is bold to approach on the eastern side, but from the northern point a reef, dry in some spots, extends in a northerly direction towards the end of the spit off Grave island, leaving a channel between them, a quarter of a mile wide, into Nakoda bay. To the eastward of this spit is a cluster of coral, nearly awash in some parts, with 7, 8, and 9 fathoms close to, lying in a North and South direction, parallel with Low Flat island, and stretching almost across the channel which in this part is 8 cables wide, limits the passage on either side of it to 2 and  $2\frac{1}{2}$  cables.

The northern extreme of this cluster of coral is 8 cables distant from the nearest part of Low Flat island, and  $2\frac{1}{2}$  cables from the edge of the reef westward of it, the soundings between being 8 fathoms. From the northern extreme Triple-top island bears N. W. by W.  $\frac{3}{4}$  W.; northern extreme of Flat island E. by N. northerly; extreme of Albion head, S.  $\frac{1}{2}$  E.; and the green conical head in Nakoda bay, in line with the shoulder of a hill at the back, S.W.-southerly.

The southern extreme is 3 cables distant from the nearest part of Albion head, and 2 cables from the edge of the reef northward of it; the soundings between being 7 fathoms. When on this extreme the highest part of Triple-top island is in line with some detached rocks off the right extreme of Grave island, bearing N.W.  $\frac{3}{4}$  W.; Back Cap peak, seen over the southern extremity of Flat island, E.  $\frac{1}{2}$  N.; and right extreme of Albion head, S.  $\frac{1}{2}$  E.

**Tides.**—It is high water, full and change, in Tay-bay-u bay, at 10h. 15 m.; springs rise 6 feet. The current is scarcely perceptible.

**Directions.**—It is almost impossible to give clear sailing directions for Tay-bay-u bay, as no mark will lead direct in, local knowledge is therefore necessary. The soundings at the entrance eastward of Triple-top island are 15 and 13 fathoms, mud, gradually decreasing to 3 fathoms at  $1\frac{1}{2}$  miles from the bottom of the bay; the reefs are all steep-to.



In making the entrance of the bay from the north-eastward, Triple-top island must not be brought to bear westward of W.S.W. until the eastern extreme of Albion head bears S.S.E., in order to avoid a 12-feet patch which lies off the extremity of Flat island reef, and E. by N.  $\frac{1}{4}$  N. nearly 2 miles from Triple top.

With the eastern extreme of Albion head bearing S.S.E., Ma-la-nut mound, about 6 miles inland, will be seen just clear of it; then steer so as to keep the summit of this about its own width open of Albion head, until the northern extreme of Grave island bears West, when the edge of the reef off Low Flat island will probably be discerned. Close this reef immediately, or before one of the marks for the north end of the cluster is on, keeping one cable off it, until the east extreme of Albion head bears westward of South, when it should be steered for in order to avoid the spit that extends 3 cables in a south-westerly direction from Low Flat island. The best anchorage is about half a mile East of Albion head, in 4 fathoms, stiff mud; with the entrance of Ma-la-nut river bearing S.S.E.  $\frac{3}{4}$  E. about 2 miles, beyond this the bay gradually shoals.

The reef off Low Flat island dries at low water springs, which is the best time to enter. At high water the edge of the reef is not well defined, but near the narrowest part of the channel there is a sand-bank on the edge, which dries at half-tide.

**Treacherous Bay**, situated nearly  $6\frac{1}{2}$  miles north-east of Albion head, is overlooked by two remarkable peaked hills (named by the old navigators Devils Cap peak) the foot of which breaks through the mangrove and forms a conspicuous yellow-looking cliff on the shore, three-quarters of a mile to the south-west of which is a stream of fresh water. Back Cap, the highest or inshore peak, is 720 feet above the sea, and has a small table spur at the back.

Palm island, the outermost and smallest of a group of four islands, lying between 3 and 4 miles north-west of Treacherous bay, is 100 feet high, and has some dark rocks on a sand patch a quarter of a mile north-eastward of it.

The two islands, Tide-pole and Patelan, immediately inshore of Palm island, are moderately elevated, the highest, Tide-pole island, being 205 feet, with a rock on its north-west side. Double island (fronting an indentation in the coast, the south point of which is an ill-defined straggling mangrove bush) consists of two low flat islands connected by a small neck of sand, the western or larger island having a wedge-shaped clump of trees on the highest part.

Reefs, partly dry at low water, extend 6 cables in a south-westerly and 4 cables in a westerly direction from Double island. The channel inside, and also throughout the bay, is full of coral, with 5 and 6 fathoms close to

the edge. The passages between Double island and the islands to the westward have 8 and 12 fathoms in them.

**CAUTION.**—It is recommended not to stand into Treacherous bay as the reefs to the northward, as well as to the north-westward of Low Flat island, extend a long distance off, and the water is usually so muddy that they cannot be seen.

The soundings vary from 10 to 14 fathoms, mud, in the bay; the points of the shore are fronted by reefs, projecting from three-quarters to upwards of a mile, and in the centre of the bay there is a 3-fathoms patch, with 13 fathoms close to. From this patch, Tide-pole island bears N.E. by N. northerly; Back Cap peak, S.E. by E.; Triple-top island, W.  $\frac{3}{4}$  S.; and the northern extremes of Albion head and Low Flat island, S.W.  $\frac{1}{4}$  W.

**The Soundings** off the coast outside Treacherous bay, are 25 and 30 fathoms, the bottom chiefly consisting of broken coral, with a thin stratum of mud in some places. There is a  $4\frac{1}{2}$ -fathoms patch 4 cables in extent, lying nearly midway on the bank, with 20 and 29 fathoms close around; from the shoalest part, Triple-top island bears S. by E.  $\frac{1}{2}$  E.  $8\frac{3}{4}$  miles; Back Cap peak, S.E.  $\frac{1}{4}$  E., Palm island, S.E. by E.  $\frac{1}{3}$  E.; Tide-pole island, S.E. by E., and Victoria peak, E. by S.

**The COAST** between Double island and Deep Bay point, 3 miles north-east of it, is low and thickly wooded, and should not be approached nearer than 2 miles, as the edge of the reef dries half a mile from the points, with rocky ground in some places a mile beyond.

From Deep Bay point to Long point, a distance of 18 miles, the general trend of the coast is N.E.  $\frac{1}{2}$  N.; and near the latter, apparently a third separation takes place in the high central range; the low land, however, at this part, is considerably above the level of that which divides the range to the southward.

**Victoria Peak**, a sharp double peak, the second highest on Palawan island, attaining an elevation of 5,680 feet above the sea, occupies a central position on the intermediate range, from which several lower ranges, of not less remarkable feature, extend on either side, forming ravines and deep gorges, thickly wooded. On the south, End peak of the range (4,512 feet high) is the most conspicuous, having a small double summit, with a saddle shoulder at the back, from which the land falls rather abruptly. The southern face slopes gradually towards the plain behind the Devils Cap peak, while a part of the same ridge (on which is Sultan peak, 3,820 feet high) lies in a south-easterly direction, and terminates in a long table spur, overlooking Island bay on the opposite shore of the island.

**Valley Cone.**—From a range immediately in front of Victoria peak a spur extends to Steep point,  $4\frac{1}{2}$  miles to the north-eastward of Deep Bay point, forming on the north side a valley, at the head of which is Valley

Cone, a remarkable conical hill lying beneath three sharp peaks on the ridge above.

The plain in front of the cone valley is densely wooded, and 3 miles from Steep point, lying close to the coast, is Cuckold hill, 280 feet high.

On the north side of the valley, the hills again approach the coast, near Bluff point, 2 miles to the eastward of Cuckold hill, thence extend along the shore to Moorsom head, a distance of 3 miles.

**Gap range.**—Immediately overlooking these hills is Brow peak or shoulder, 3,840 feet above the sea, forming the extremity of a ridge which here takes a sudden trend to the eastward, attaining an elevation of about 5,000 feet at its highest part, and having two gap peaks on it halfway.

The northern face of this range is a steep slope, with deep ravines, and some conical hills at the foot, of which Brow Cone, 1,180 feet high, over Bluff point, is conspicuous.

**Water.**—A copious stream of fresh water flows into the sea, immediately to the northward of Cuckold hill.

**The COAST.**—The bay northward of Deep Bay point is bold to approach to half a mile of the shore, the depth at that distance from it being 10 and 12 fathoms; but from Steep point to Bluff point the coast is fronted by a reef, extending from 3 to 5 cables off, the edge of which is dry in some places, and has a black rock on it at nearly a mile northward of the former point.

In a small bay southward of the latter point is a cliff rock close to the shore.

**Peaked island,** 110 feet high, with a rock, 23 feet out of water, nearly three-quarters of a mile to the westward of it, lies off the entrance of the fresh-water stream above mentioned, and about a mile from the shore, to which the reefs dry half way at low water springs, leaving a small channel between them into the river.

About a mile S.W. from Peaked island, and the same distance from the shore, is a 3-foot patch, from which rocky ground extends a mile in a south-westerly direction, with 18 and 20 fathoms, mud, close to; and W.  $\frac{3}{4}$  S.  $1\frac{1}{4}$  miles from the 23-foot rock off Peaked island, is a  $4\frac{1}{2}$ -fathoms coral patch, with 17 and 23 fathoms close to. To avoid both these, keep the back or highest peak of Devils Cap open of the low land about Deep Bay point.

**Moorsom head,** situated  $3\frac{1}{4}$  miles beyond Bluff point, is rather a prominent headland, moderately elevated, with a small rock out of water half a mile to the westward, and a reef awash, lying  $1\frac{1}{2}$  miles northward, and a mile from the shore, with 7 fathoms inside it.

**Water.**—There is a stream of fresh water at the base of Moorsom head, in a sandy bay on the north side, and also at the extremity of the beach nearly a mile to the north-eastward.

**LONG POINT**, situated  $5\frac{1}{2}$  miles north-west of Moorsom head, is densely wooded, moderately elevated, and gradually sloping from the centre, terminating in a rocky coast, with several small sand bays and a reef extending 2 cables from the northernmost point.

Long point is steep-to, having 15 fathoms within one quarter of a mile, and 20 fathoms at one mile from it.

**APPURAWAN.**—At 5 miles north-eastward of Moorsom head and close to the southward of Long point is Appurawan roadstead, where a vessel may obtain a few supplies, such as goats, fowls, vegetables, &c., from the natives, who occupy small farms, scattered over a considerable tract of country inland, and which are approached by a small river that disembogues on the south side of Appurawan head,  $1\frac{1}{2}$  miles from Long point.

A low wooded range, partially cleared, with some huts, extends along the coast to the southward of the river, and at the back there is some undulating ground, apparently under cultivation. The river is fresh, but it is impracticable as a watering place, owing to a reef which extends one quarter of a mile from Appurawan head, and dries across the entrance.

Appurawan is the southernmost of the Christian settlements on this side of Palawan, the natives being chiefly Baquit people, and holding no intercourse with the Malays to the southward. They cultivate rice, maize, sweet potatoes, tobacco, cotton, in small quantities; and manufacture from the fibre of the plaintain the coloured textile garments usually worn by them. Bees-wax and tortoiseshell form articles of export. They preferred wearing apparel of every description, crockery, hardware, &c. &c. to money, in exchange for their supplies; willingly receiving a pound of gunpowder for five fowls, and a shirt for a bread-bag full of vegetables.

**Anchorage.**—The best anchorage is westward of Appurawan head, in 17 or 18 fathoms, stiff mud and shells, about 2 miles from the shore, with the extremity of Long point bearing N.E. Rocky ground extends a mile to the westward of the head, where three-quarters of a mile W. by S. of it there are only 3 feet water, with 4 and 9 fathoms immediately outside.

**The soundings** off the coast from 'Iay-bay-u bay to Long point are irregular, varying from 20 to 30 fathoms, with patches of 12 and 15 fathoms occasionally. When 8 or 10 miles from the shore they increase

to 40 and 45 fathoms, generally mud, the nature of the bottom changing to sand and broken coral where the water is shoaler.

From Long point the coast (which is generally free from coral, and has some good sandy beaches with deep water close to them), trends north-eastward 29 miles to Table point, the soundings from 2 to 3 miles off being 30 and 35 fathoms, mud.

**Mountains and hills.**—East of Long point are two remarkable sharp peaks, of nearly equal elevation (the northernmost, named Anipahan, being the sharper), from which small table spurs project; they are connected with Long point by a gradual slope in the range, on which are some round-topped hills, usually visible when the more elevated land is capped. There is a deep valley to the northward, overlooked by a sharp shoulder 3,606 feet above the sea, which is the commencement of another central range broken up into summits of various configuration, extending to Ulugan bay.

The most remarkable of these are mount Stavely, 3,930 feet high (a needle peak rising from the centre of a small table summit immediately to the northward of the sharp shoulder), and two dome-shaped mountains farther northward, the southernmost of which, named Thumb peak, (3,260,) is the highest part of the range, and has a knob on it; the other, mount Beaufort, has a small hollow in the highest part; and in the afternoon when the sun is out, a conspicuous red slip, assuming the shape of the letter V, will be seen on a slope in front of a peak to the southward of these.

From mount Beaufort the range gradually falls, and is again almost separated between mount Herschel and mount Peel, a low ridge only connecting them. Between the former there are two sharp peaks, the northern lying more inland, and having a double hill in the hollow of the range between it and mount Herschel.

Mount Herschel is 2,316 feet above the sea, and has a smooth summit sloping to the south-westward.

The western face of the range slopes gradually towards the coast, forming deep ravines.

**NORTH and SOUTH REEFS.**—There is a small bay on the north side of Long point, to the northward of which are two rocks lying parallel with the shore a mile off, and  $1\frac{3}{4}$  miles apart, with 17 fathoms between them. South reef is 20 feet out of water and bold to approach, the soundings around it being 18 and 20 fathoms; North reef is awash at high water. The depths in the bay are 12 and 14 fathoms, mud, and 20 and 30 fathoms off the entrance.

**Water.**—There are some streams of fresh water in the above bay, but where the best flows the shore is fronted with coral, which extends 2 cables from it, with 3 and 4 fathoms close to the edge.

**ANIPAHAH**, about 10 miles north-east of Long point, is a small settlement of Baquit people, where there are one or two huts, and a little cleared ground, on the spur of a hill that approaches the coast from the high range, and terminates in a small rocky point. The shore, 2 miles on either side of this point, is fronted by coral, which extends about 2 cables off, with 3 and 5 fathoms water close to the edge.

**HEN and CHICKENS**.—Bluff point,  $12\frac{3}{4}$  miles north-east of Anipahan point, is formed by a spur from mount Herschel, and has a bay to the northward of it, half way between which and Table point, 6 miles beyond, is a small group of islets and rocks named Hen and Chickens, lying  $1\frac{1}{2}$  miles from the shore, with 19 and 27 fathoms water between them and Sprat point to the eastward. The north-west islet is about 80 feet above the sea, and when first seen is liable to be taken for a sail;  $1\frac{1}{2}$  miles northward of it is a dry reef, close to which the depth is 25 fathoms.

Mount Airy, a double-top summit lying at the foot of mount Peel, overlooks Hen and Chickens bay, to the southward of which, between it and mount Herschel, the ridge is very low.

The soundings throughout the bay vary from 20 to 30 fathoms, mud; but north-west from Sprat point, in the direction of the dry reef, is a rocky ridge, nearly a mile from the point, on which the least water found was  $4\frac{1}{2}$  fathoms.

**Water**.—On the shore are numerous small sand bays free from coral with streams of fresh water in some of them, the supply depending on the season; and on the beach to the northward of Sprat point an abundant haul of fish was taken with the seine.

Table point, nearly 3 miles north-eastward of the Hen and Chickens, has a small detached rock at the foot of it, and a conical hill on the summit. On the north side, half way down the cliff, are two white spots; and to the eastward 2 miles, under a table range adjoining the foot of mount Peel, is a waterfall.

**Mount Peel**, 3,600 feet above the sea, rises immediately at the back of this, and has an abrupt fall in the spur extending towards mount Airy. The north and western faces have sharp ridges with deep ravines extending to the coast, giving it a bold rocky appearance; and on the eastern side a second peak, Ba-hé-lee, precisely similar in feature, rises to an elevation of 2,406 feet, from which a long slope extends in a south-westerly direction nearly across the island. The sides of the mountain are serrated with watercourses of a reddish aspect.

**The coast** between Bluff point and N.W. head, at 4 miles north of it, is of a bold, rocky, barren aspect, with several high cliffs; and about  $2\frac{1}{2}$  miles southward of N.W. head is a remarkable square gray patch. The whole shore is bold to approach, having 17 and 20 fathoms close to.

Car-so-glan, a high quoin-shaped hill as seen from the westward, lying to the northward of and connected with mount Peel by a low ridge, is close to the shore midway between Table point and N.W. head, and forms part of the range which overlooks Oyster inlet in Ulugan bay.

On the peninsula to the northward of Car-so-glan are hills of less elevation, connected with each other by the low ridges which form the head of the inlets in Ulugan bay: the northern extremity, named Manibure or N.W. head, 600 feet above the sea, terminates in a bold precipitous cliff, with a detached rock about 40 feet high at the foot of it.

**ULUGAN BAY**\* (named by the natives Banōg), on the eastern side of N.W. head, is 2 miles wide at the entrance between Cordelia point and Broken head, and 8 miles deep in a southerly direction. The northern part of the eastern shore of the bay is bold, cliffy land, and of reddish barren aspect. Sangbowen, the north peak, 1,816 feet high, has a small table summit when seen in a north-easterly direction, and two sharp nipples on the brow in front of it. Bentoan, 1,730 feet high, situated immediately to the southward of Sangbowen, and separated from it by a low wooded valley, which forms the back of the watering bay, is sharp when viewed as above, and has a lower range adjoining it to the southward with four distinct summits. The remainder of the eastern shore is a shelving mangrove coast fronting a low wooded range on which Harbour hill, 960 feet, with a conical hill, 1,120 feet above the level of the sea, to the south-eastward of it, are the most conspicuous. This range is separated from the high land of Bentoan by a shallow inlet named Tagnipa, at the head of which is a remarkable wooded limestone cliff named Deans head.

**Three-peaked Island**, or Ca-mung-yan, the highest summit of which is 140 feet above the sea, lies N.  $\frac{2}{3}$  E.  $1\frac{1}{4}$  miles from N.W. head.

A rocky ledge, consisting of sand and coral, extends a mile to the southward of Three-peaked island, almost across the passage, on which the average depth is 9 and 12 fathoms, with 19 and 25 fathoms at 2 cables on either side of it. At  $1\frac{1}{4}$  cables N.N.E.  $\frac{1}{3}$  E., from the highest peak of Three-peaked, is a rock, which generally shows, with another rock visible only at low water, half a cable northward of it.

**Reeta Island**.—The western shore of the bay is undulating high land, with three inlets, and is fronted by Reeta island,  $1\frac{1}{2}$  miles long, north and south, and about 200 yards broad; it has a detached rocky head at its northern extreme, 45 feet in height, called Observatory rock, in lat.  $10^{\circ} 6' 11''$  N., long.  $118^{\circ} 46' 26''$  E., part of the base of which shows white on entering the bay. From Observatory rock, rocky ground with 5 and 7 fathoms water, extends in a northerly direction about 2 cables. The eastern shore of the island is steep-to, having 19 and 20 fathoms

\* See Admiralty plan of Ulugan Bay or Banōg, No. 2,913; scale,  $m=2.5$  inches.

within a cable of the coral, which fringes it. A reef, dry at low water, extends nearly a cable off Tide-pole point, the southern extremity of the island; the edge of the reef is generally well defined by the discoloration of the water.

The channel to the westward of Reeta island is about 3 cables wide, and has 13 and 17 fathoms in it, but abreast of South inlet it is choked with coral patches, having 9 and 10 fathoms between them. In heavy northerly gales this channel appears to break across.

**Magsiapo Reef**, with 10 and 12 feet water, extends 6 cables westward and north-westward of Reef islet, which lies nearly 2 cables from Marabay point on the eastern shore of Ulugan bay, and has its outer edge one mile from the southern part of Reeta island. At  $1\frac{1}{2}$  miles S.S.W.  $\frac{1}{2}$  W. from Reef islet is the centre of a rocky patch, more than half a mile in extent, upon which the sea generally breaks at low water. The high nipple (1,254 feet) on the brow of Sangbowen open of Broken head, bearing N.  $\frac{3}{4}$  E., leads on the western edge of this. It is, however, too far up for vessels to approach, as the head of the bay is lined with reefs, which project in some places upwards of half a mile from the shore. The above mark also just clears the Magsiapo reef, and is a good guide to keep vessels to the westward when working out of the bay until they are past the entrance to Tagnipa inlet.

**Oyster Inlet**, the southernmost inlet on the western shore, lies 6 cables south-west of Tide-pole point, and is  $1\frac{3}{4}$  miles deep in a W.N.W. direction, being separated from the coast outside by a low ridge nearly a quarter of a mile broad. Reefs, which project from both points, contract the channel at the entrance to one quarter of a mile in breadth; they also fringe the shore inside to the extent of one cable, gradually increasing towards the head of the inlet, where a bank of mud and rocks extend off half a mile, on which good oysters may be found. There are 19 fathoms at the entrance, which depth gradually decreases over a stiff muddy bottom to 9 fathoms, close to the reef at the head of the inlet.

The two small inlets to the northward of Oyster inlet are shoal.

At  $3\frac{1}{2}$  cables east from Coral point, south side of entrance to Oyster inlet, and south-westerly nearly three-quarters of a mile from Tide-pole point, are some small detached coral patches, nearly awash at low water.

**Cai-ho-lo and Ba-hé-lee** are two small rivers which empty themselves near the south-west corner of Ulugan bay, and in the rainy season have fresh water very near their entrances. Cai-ho-lo river breaks through the mangrove between the high ranges of Car-so-glan and Cai-ho-lo,  $1\frac{1}{2}$  miles to the southward of Oyster inlet. It is navigable for boats about half a mile, where a good stream of water is generally running, but owing to the extensive reefs which line the bottom of the bay, neither this nor the Ba-hé-lee river are good watering places. The Ba-hé-lee has a



small islet at its entrance, which is S.E. by S.  $1\frac{1}{4}$  miles from the mouth of the Cai-ho-lo, and is navigable for boats about  $1\frac{1}{4}$  miles. A short distance beyond this is a small farm on some rising ground, occupied by a few natives from Baquit, who collect principally bees-wax, and cultivate the land in a small way.

Between the two rivers is a small islet named Tara-cai-a-wan, nearly half a mile to the southward of which is a white rock, and though small, generally forms a conspicuous object after entering the bay.

**The Soundings** in Ulugan bay are 30 to 35 fathoms at the entrance, gradually decreasing towards the bottom of the bay to 12 fathoms, green mud, close to the edge of the reef.

**The Anchorage** in Ulugan bay is at the southern extremity of Reeta island, off the entrance of Oyster inlet, in 20 fathoms, stiff mud. No experience was had of the anchorage in the north-east monsoon. During westerly gales the swell sets home to the bottom of the bay, breaking heavily upon the reefs, especially on the eastern shore. In the month of November, during one of these, which shifted to the north-west, H.M.S. *Royalist*, riding with a whole cable at this anchorage, was at times pitching fore-castle under.

**Water.**—Good water can be obtained in a small bay, with a stony beach, to the southward of Sangbowen, N. by E.  $\frac{3}{4}$  E.  $4\frac{1}{4}$  miles from Observatory rock, and E. by N. of Three-peaked islet. It is not, however, practicable to land there at all times, for, except in fine weather, a heavy swell usually sets in. The anchorage also is unsafe, having 30 fathoms as close to the shore as it would be prudent for a vessel to lie, and from which it might be difficult to weigh with a westerly wind.

**Caution.**—Sailing vessels being compelled to water here, should not anchor nearer than one mile to the shore; and they should be prepared to weigh on the slightest indication of a westerly wind, as the swell is liable to come in suddenly.

The *Royalist*, while at anchor off this bay in the month of November, was caught in a strong westerly wind which brought in a heavy swell, and with difficulty escaped clear, being obliged to slip her cable.

During the fine season, i.e. from April to July or August, fresh south-east winds usually blow over the low land at the bottom of the bay; and in calm weather swarms of butterflies are constantly crossing the bay from the eastern shore.

**Tides.**—It is high water, full and change, in Ulugan bay at 9 h. 30 m.; springs rise  $5\frac{1}{2}$  feet.

No perceptible current was observed in the bay, except after heavy rains, or when westerly winds have prevailed, when there is a light out-draught.

**Directions.**—Vessels bound to Ulugan bay, or any of the harbours of Palawan to the northward, should conform to the directions given for navigating the Palawan channel, and ought not to attempt, except under favourable circumstances, to cross the bank to the southward of the parallel of  $10^{\circ}$  N.

If coming from the southward, it is recommended to be near the edge of the bank at daylight, with mount Peel bearing about E. by S., when Three-peaked island, at the entrance of Ulugan bay, will bear E.  $\frac{1}{2}$  N., distant about 37 miles. Approaching in this direction, the bay will be readily recognized when a considerable distance off, by some high rugged land, and a remarkable dome-shaped hill named St. Paul, just seen over a lower range forming the north point of the bay. At the back of this Cleopatra needle (sharp peak) rises, being the southernmost and highest of a range extending  $5\frac{1}{2}$  miles in a north-easterly direction (page 201). To the southward is mount Peel, already noticed, comparatively an isolated mountain, sloping gradually from the summit to the base, situated S.W. 4 miles from the bottom of the bay, and S. by W.  $\frac{1}{2}$  W. 10 miles from Three-peaked island.

Approaching from the northward the bay is more readily distinguished, apparently by a complete separation between mount Peel and the high land to the south-westward of the Cleopatra range, the low land at the bottom of the bay not being discernible until within a few miles of cape Sangbowen.

If with a south-west or westerly wind, pass to the southward of Three-peaked island, not borrowing too much on the Manabure shore, where the vessel is liable to be baffled under the land. Pass at a convenient distance to the eastward of Reeta island, in order to avoid being set towards the Magsiapo reef, the western edge of which is cleared by keeping the high nipple, on the brow of Sangbowen, to the westward of Broken head, and proceed to the anchorage.

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## CHAPTER X.

## WEST COAST OF PALAWAN ISLAND.

## ULUGAN BAY TO NORTH CAPE.

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VARIATION  $1^{\circ} 20'$  East in 1879.

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**ST. PAUL BAY.**—Eastward of cape Sangbowen, the north-eastern point of Ulugan bay, and separated from it by a low wooded valley, is mount Blomfield, high table land upwards of 2,000 feet above the sea, with several small nipples on the summit, and steep watercourses down the side, terminating in a bold barren-looking coast, immediately to the eastward of which is St. Paul bay.\*

Overlooking the bay on the south are some very remarkable dome-shaped hills and perpendicular cliffs of limestone formation, the most conspicuous of which is St. Paul, 3,370 feet above the sea, from which the bay derives its name. To the eastward of this is a range, named by the old navigators the Four peaks, of which Cleopatra needle, 5,200 feet in height, is the southernmost and highest.

The second peak from the north is 4,730 feet above the sea, and has a small slip close to the summit.

The northern termination of the range is abrupt, and there is a high round topped hill lying almost immediately under, between it and the coast.

Cliff head, bearing N.E.  $\frac{1}{2}$  E.,  $9\frac{1}{4}$  miles from cape Sangbowen, and forming the northern extremity of St. Paul bay, is a long wooded promontory, terminating in an abrupt fall 350 feet above the level of the sea. A smaller head, with a detached rocky islet on the north side, juts out into the bay immediately to the southward of it, one mile to the south-westward of which is a rock awash, with 7 to 9 fathoms close to.

The shore of St. Paul bay is bold to approach, having 7 fathoms near the points, and from 12 to 16 fathoms (fine sand and shells) in the centre.

**Jibboom (Tibbvon) bay**, the entrance to which lies between Cliff head and Peaked point, at  $4\frac{1}{2}$  miles N.N.E. of it, has a small group

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\* See Admiralty plan:—St. Paul bay to Emergency point, No. 2,912; scale,  $m = 1.5$  inches. This plan includes Jibboom bay, May-day bay, Port Barton, Pagdanan bay, and Imuruan bay.

of islands and rocks near the centre, Bay island the largest has a flat summit, 307 feet above the sea. Abreast this group on the south side of the bay is a long point, with deep sandy bays on either side, and a remarkable hill (2,015 feet high), with a nipple shoulder at the back. The depths in the centre of Jibboom bay are 12 to 15 fathoms, and 5 fathoms at its head. The small inlet on the south-east side of the upper part of the bay is shoal.

Shelter from north-east winds will be found in 15 fathoms about three-quarters of a mile to the south-eastward of Bay island group, with Zoe, the easternmost islet, and Peaked point, the northern extremity of the bay, in line bearing N.  $\frac{3}{4}$  E. The channel northward of the group is a mile wide, with 16 to 23 fathoms water.

**The Soundings** northward of Ulugan bay, and off this part of the coast, vary from 17 to 30 and 50 fathom, chiefly sand bottom, except those under 30 fathoms, when it is usually coarse sand and shells, or broken coral.

**The COAST** from Peaked point (which has a detached rock, about 100 feet high, close off it, with one smaller,  $3\frac{1}{2}$  cables to the southward), trends N.N.E.  $2\frac{1}{2}$  miles to a steep bold point, named Amalingat, at the foot of which lies Nine-pin rock, with a reef awash half a cable westward of it.

From this point the coast trends suddenly to the eastward, and off the first point from it are two islands, named Cacbolo and Cabalas, which form part of the western side of May-day bay.

Cacbolo island lies N. by E. of Amalingat point,  $1\frac{1}{4}$  miles from the shore, and is separated from Cabalas by a channel two-thirds of a mile wide. It has two summits of nearly equal elevation, about 400 feet above the sea, and a sandy bay on the eastern side. The north and west faces are bold steep cliffs, and off a sloping point at the north-east extremity of the island is a reef awash.

Cabalas or Catalat island, the larger of the two,  $3\frac{1}{4}$  miles in circumference, has a remarkable clump of trees near the summit, and is connected with the main by a narrow isthmus, on which are two pyramidal whitish-looking rocks.

The bay between these islands and Amalingat point, in which there are from 19 to 26 fathoms, is overlooked by a range, of which Cabalas peak, 1,465 feet above the sea, is the highest part separating it and also the bottom of May-day bay from the head of Jibboom bay.

**May-Day Bay**, immediately to the eastward of Cabalas and Cacbolo islands, affords good shelter in the south-west monsoon, and is by far a more convenient anchorage for wooding and watering than any of those we have described to the southward on this side of Palawan.

It is  $3\frac{1}{2}$  miles wide at the entrance, between Cacbolo and Cacnipa islands,  $5\frac{1}{2}$  miles deep, and is formed on the eastern side by a long irregular-

shaped promontory, the continuation of a high range jutting out in a northerly direction from the island.

Cacnipa or High island lies off the extremity of the above promontory, and is separated from it by a channel 4 cables wide, in which is Passage reef, about 6 feet out of water. The island is steep and bold, 1,050 feet high and  $3\frac{1}{2}$  miles in circumference, with two summits, the southern being the higher. There is a remarkable thumb rock off the south-western point, and a peaked rock lies 3 cables from the northern shore of the island.

In the south-eastern part of May-day bay is a remarkable conical head, with deep sandy bays on either side. The bay on the north side is irregular in contour, and as 14 to 20 fathoms in it, while that on the south side has 19 and 20 fathoms at the entrance, and a similar but smaller conical head in it, with some streams of fresh water breaking through the beach.

The soundings at the entrance of May-day bay are 25 and 27 fathoms, sand and mud, gradually decreasing to 19 fathoms close to Conical head. The points in the bay appear to be steep-to, and there is no known danger in it but what shows.

**Water.**—The watering place is at the head of a small cove, named Watering bay, 2 miles S.W. by W. of conical head. The best anchorage is in 19 fathoms off the entrance of this bay, almost midway between it and Conical head, with the tangents of Cabalas and Cacbolo islands in line. The stream falls from the rocks on the south side of the cove, just before coming to the sand beach, where, at high water, or even at half tide, a boat can go almost under it.

**Tides.**—It is high water, full and change, in May-day bay, at 9 h. 55 m. rise (only one observation)  $3\frac{1}{2}$  feet.

**BOAYAN**, lying N.E.  $3\frac{1}{4}$  miles from Cacnipa island, is an irregular-shaped island nearly 5 miles in extent East and West, and  $3\frac{1}{2}$  miles N.N.E. and S.S.W., being in some parts less than half a mile broad. Its north-western extremity terminates in a bold conspicuous head, with a double summit 725 feet above the sea; and the shore all around, except on the south side, partakes of somewhat similar features. The highest part of the island is about 910 feet in height, and near it is a flat double summit, apparently of the same elevation.

Two islands lie from  $3\frac{1}{4}$  to 4 cables off Bluff point, the south-western extremity of Boayan; Saddle island, the southernmost, has a reef awash between it and the point, and also some peaked rocks extending 2 cables from its south-eastern side. Lump island, the northernmost, is very abrupt and has two rocky islets inshore of it.

Shelter from south-west winds will be found on the north-east side of Boayan, in about 15 fathoms, at three-quarters of a mile to the northward of Broughton point, the eastern extreme of the island.

**Boayan Reef**, awash, lies 2 cables from the southern shore of Boyan island, and E. by N.  $\frac{1}{2}$  N. nearly 3 miles from Saddle island. There are 24 fathoms water 2 cables south of this reef.

**Royalist Shoal**, composed of coral with only  $2\frac{1}{2}$  fathoms over it, lies E.S.E. one mile from Saddle island, with the summit of Cabalas open of the south-eastern side of Cacnipa island bearing S.W.  $\frac{1}{4}$  W.

**ALBAGUEN ISLAND**, lying nearly 3 miles eastward of Cacnipa, and  $2\frac{1}{2}$  miles southward of the south-west extremity of Boayan, is 570 feet high, and nearly  $1\frac{1}{2}$  miles in extent, with a conspicuous red stripe (land-slip) on the north-west side, close to which, and connected to the island by small isthmus, is a sharp conical head.

**PORT BARTON.**—Albague island is the extremity and largest of a group of islands stretching in a north-westerly direction from the eastern shore across the mouth of a deep bay, and which, together with the promontory mentioned on page 203 as forming the eastern side of May-day bay, encloses a spacious sheet of water, to which the name of port Barton has been given.

The entrance to port Barton is between point Riddle, the south-west extremity of Albague, and point Bubon, the north-east extremity of the promontory, which is in lat.  $10^{\circ} 29' 19''$  N., long.  $119^{\circ} 5' 37''$  E. From the latter point the harbour extends  $5\frac{1}{2}$  miles in a southerly direction, and near its head is Endeavour island, three-quarters of a mile in length north and south, having Wedge islet lying off its south-eastern face, half-way to the shore. There is, however, nothing to induce vessels to go beyond Middle reef, nearly 3 miles within the entrance, the harbour affording no good watering place, although there are several streams in the mangroves bordering the shore, which is apparently rocky in that direction. The soundings at the entrance of the harbour are about 25 fathoms, mud, decreasing gradually to 5 and 6 fathoms close to the edges of the reefs which fringe the shore at the head of it.

**Queens Bay.**—South  $1\frac{3}{4}$  miles from point Bubon is Oyster point, and between is Queens bay, overlooked by Queens bay peak (1,030 feet), the highest part of the range also overlooking May-day bay; its shore is fringed with coral, extending from one to 2 cables off, with deep water close to the edge.

**Capsalay, Double, and Regatta Islands.**—Capsalay, the inner and next island in point of size to Albague, of the group forming the north-eastern side of port Barton, is connected with the mainland by a reef almost dry at low water; and South 4 cables from the east extreme point of the island are two rocks awash, with 6 and 7 fathoms close to.

At less than a cable from the western extremity of Capsalay is Double island, nearly half a mile in length east and west, the south side of which

is foul for a cable off. To the north-west of Double island, and separated by a channel  $1\frac{1}{2}$  cables wide, with 6 feet water in it, is Regatta island, nearly one-third of a mile in extent, N.N.W. and S.S.E. These two islands are the south-westernmost of the group.

**Capsalay Reef**, a coral patch one cable in extent, and nearly awash at low water, lies half a mile southward of the western summit of Double island, with point Riddle in line with the south-west extreme of Regatta island bearing N.N.W.  $\frac{1}{2}$  W.; and Oyster point in line with Queens bay peak, W.  $\frac{1}{4}$  S.

**Middle Reef**, 2 cables in extent, and awash at low water, lies S.W.  $\frac{1}{2}$  S. nearly  $1\frac{1}{4}$  miles from Capsalay reef, and the same distance S.E.  $\frac{1}{2}$  E. of Oyster point. From this the ground appears more or less rocky in an E.S.E. direction to the shore.

**Anchorage**.—If requiring shelter only, in port Barton, and in the south-west monsoon, anchor in the northern part of the bay in 20 fathoms, stiff mud, with Queens bay peak bearing about S.W.  $\frac{1}{2}$  W., and Bubon point just shut in with Saddle island N.  $\frac{1}{2}$  W., where a vessel will be land-locked. In north-east winds, vessels wishing to seek closer shelter for repairs, &c., will find good anchorage in 12 fathoms, mud, farther to the eastward, south of Capsalay island, care being taken in approaching it to avoid Capsalay reef.

**TIDES**.—It is high water, full and change, at port Barton at 10 h. 50 m.; springs rise 6 feet.

**PAGDANAN POINT** is a peninsular head of reddish aspect, situated nearly  $2\frac{1}{4}$  miles E.S.E. of the eastern extremity of Boayan island; Confusion rock, white, and about 40 feet high, lies 3 cables. N.W. from Pagdanan point; immediately to the southward of this point is an extensive land-slip, and a double island almost connected with the shore at low water.

**Niaporay Island and Rock**.—Niaporay island, 354 feet above the sea, lies in the channel between Pagdanan point and Boayan island, at half a mile from the latter; and S.E. by E. half a mile from the nearest point of Niaporay is the southernmost of two rocks, which lie nearly in the centre of the channel. There are only 9 feet over Niaporay rock at low water, the depths in the immediate neighbourhood varying from 4 to 7 and 9 fathoms with 12 and 17 fathoms on either side. From this rock Queens bay peak in port Barton is in line with the south-eastern extreme of Albaguen island bearing S.W.  $\frac{1}{4}$  W.

There is also a  $2\frac{1}{2}$ -fathoms patch, lying E.N.E. half a mile from the summit of Niaporay island, with 4 and 5 fathoms close to.

**Pagdanan Rock**, the northernmost of the two rocks just noticed as lying nearly in the centre of the channel, has  $2\frac{1}{4}$  fathoms on it, with 7

and 10 fathoms close to, and lies N.E. by N. one mile from the Niaporay rock. From Pagdanan rock Confusion rock is in line with the western extreme of Pagdanan peninsula bearing S.S.E.  $\frac{3}{4}$  E., and the eastern extreme of Niaporay island nearly in line with the sharp conical head joining Albaguen island, about S.W. by W.  $\frac{1}{4}$  W.

**PAGDANAN BAY.**—At  $2\frac{1}{2}$  miles to the north-eastward of Capsalay island is point Betbet, with a conical hill near, and a small islet of the same name off it, from which a coral spit projects nearly two-thirds of a mile in a W.N.W. direction.

The coral extends nearly one-third of a mile from the shore on the north side of Capsalay island, and nearly two-thirds of a mile in a northerly direction from the point on the mainland immediately eastward of it, with 9 and 13 fathoms close to the edge.

At two-thirds of a mile in a north-easterly direction from point Betbet is Reef point, between which and Pagdanan peninsula is Pagdanan bay,  $2\frac{1}{2}$  miles wide at the entrance, and about the same distance deep. A range of hills rises to the height of about 2,000 feet at the back of the bay.

Reefs lie off the points in the bay, some to the extent of half a mile; and on the shore are several small red marks, caused by slips in the land.

**Water.**—A fresh-water rivulet disembogues at the foot of a small green cliff island in the centre of Pagdanan bay; and there are also two others in the south part near Squall point.

**Anchorage.**—The soundings to the southward of Boayan island average about 24 fathoms, mud. At the entrance of Pagdanan bay there are 10 and 12 fathoms. Vessels not wishing to go into port Barton will find good shelter from south-west winds to the northward of Capsalay island; and from north-east winds in Pagdanan bay. Approaching either anchorage from the westward, care must be taken not to bring the southern summit of Saddle island to the westward of N.W. by W. till the highest part of Cabalas island is seen in the centre of the passage southward of Cacnipa island, about S.W.  $\frac{1}{4}$  W., in order to avoid the Royalist shoal.

**MOUNT CAPOAS,** N.E.  $\frac{3}{4}$  N.  $16\frac{1}{4}$  miles from Bold head (Boayan island), and in lat.  $10^{\circ} 48' 10''$  N., long.  $119^{\circ} 16' 56''$  E., is table-looking land, 3,350 feet above the sea, with a high and a low sharp nipple at the western shoulder, and a conspicuous land-slip extending two-thirds of the way from the summit to the base, immediately under it. The table part is a sharp uneven ridge extending one mile in an east and west direction, from which the land falls suddenly on all sides.

The mount rises near the south-western extremity of an extensive



peninsula, which, on the north, forms part of the secure and capacious sound of Malampaya, and on the south, the bay of Imuruan.

**IMURUAN BAY** formed by Boayan island and Pagdanan to the southward, and Emergency point, under mount Capoas, to the northward, is about 12 miles wide at the entrance. Its eastern shore is overlooked by a high range of hills, of which Bay peak, nearly abreast of Imuruan island, is the most conspicuous. Farther to the southward over Pagdanan bay the range is lower and assumes a table-ridge. From the low neck of Pagdanan peninsula the shore of the bay for  $8\frac{1}{2}$  miles is almost one continuous sand beach, with small rocky heads here and there, the two southernmost having each a small cliff rock off. The coast thence is bold and rocky for about  $2\frac{1}{2}$  miles, beyond which is a sandy beach for 3 miles, thence to Emergency point,  $3\frac{1}{4}$  miles, the northern shore is rocky. The shore nearly throughout the bay is bold to approach, having 3 to 5 fathoms close to the beach. At the entrance the soundings vary from 20 to 30 fathoms, mud.

Shelter from north-east winds will be found to the northward of the islands, near the foot of mount Capoas, in 19 fathoms, mud; where also a tolerably good supply of fish may be obtained with the seine, on the sandy beaches opposite.

**Wedge Island (Maninbulao)**, lying at the entrance of Imuruan bay, N.N.E.  $\frac{2}{3}$  E.  $9\frac{1}{4}$  miles from Bold head, is small, wedge-shaped, 180 feet above the sea, and thickly wooded.

**Imuruan or Bay Islands.**—In the north-east corner and nearly opposite the bold rocky shore of the bay, and 6 miles E. by S.  $\frac{1}{2}$  S. of Wedge island, is Imuruan island, with a smaller island, named Lampinigan, lying near it on the west side.

Imuruan island is 500 feet above the sea,  $2\frac{1}{4}$  miles in circumference, and has a reef extending 3 cables from the eastern side, between which and the shore there is a channel  $1\frac{1}{4}$  miles wide, with 6 and 7 fathoms in it.

**CAPE CAPOAS**, situated N. by E.  $\frac{1}{2}$  E.  $16\frac{1}{2}$  miles from Bold head, and nearly North of Wedge island, is a bold projecting headland with two summits, and the extreme western point of the peninsula, on which the table mountain of that name is situated; which bears from it S.E.  $\frac{3}{4}$  E. distant  $5\frac{1}{4}$  miles.

**Conflagration Hill.**—N.N.W.  $\frac{1}{2}$  W. nearly 5 miles from Emergency point, and 2 miles to the south-eastward of cape Capoas, lying off one of the points of the several bays with which the coast is indented, is a remarkable steep conical island, connected with the shore at low water, with a small head, similar in feature, but of whitish aspect at the foot of it. It is named Conflagration hill from an accident having occurred there,

which proved fatal to one man, and nearly so to an officer and part of a boat's crew who were ascending it for the purpose of making observations, in consequence of the long grass having been inadvertently set on fire, the flames of which spread so rapidly as to overtake them before they reached the summit.

Shelter from north-east winds may be found in the first bay to the eastward of Conflagration hill, about West of Low Nipple (mount Capoas), a peak rising 1,560 feet above the sea, immediately to the northward of the table mount Capoas, and, next to it, the highest on the peninsula. A rocky head, nearly in the centre of the bay, separates the line of sand beach; from this head a reef awash extends nearly 4 cables in a south-westerly direction, with 4 fathoms close to the edge.

To the northward of cape Capoas for 6 miles to Diente point, the south-western point of the entrance of Malampaya sound, the coast is deeply indented, the bottom of some of the bays being separated from those corresponding to them on the opposite side of the peninsula and in Malampaya sound, by very narrow isthmuses.

**INLULUTOC**, the largest of these bays,  $1\frac{1}{2}$  miles wide and  $2\frac{1}{4}$  miles deep, lies nearly midway between cape Capoas and Diente point, and affords good shelter in the north-east monsoon. It is overlooked on the north by Saddle hill, 1,000 feet above the sea, which, together with Chinongab (page 210) to the north-eastward, form conspicuous objects to identify the locality. There are no dangers in any of these bays but what are visible. The bights and some of the points are fringed with coral, the edges of which can generally be discerned by keeping an ordinary look-out. Outside, the coast is bold, rocky, and very precipitous in some places, with deep water close-to.

In the bay immediately northward of Inlulutoc is a conspicuous land slip, at the foot of Saddle hill.

**Anchorage; Water.**—The best place to anchor in Inlulutoc (the only eligible bay for vessels to enter) is on the north shore,  $1\frac{1}{4}$  miles to the eastward of Wreck head, a bold rocky cliff forming the north point of it, between Theodore point and Anchorage island, in 15 and 16 fathoms, mud, with Saddle hill bearing about N. by W., where near the foot of it, at the head of the bay, are two streams of fresh water. The shore, however, is difficult of access, owing to the coral fringing the bay, which off Theodore point extends half a cable.

**The Soundings** off this part of the coast vary from 30 to 40 fathoms, mud. In the bays, they decrease gradually from 20 to 25 fathoms at the entrance, to 7 and 9 fathoms close to the shore.

**MALAMPAYA SOUND**, formed on the north-eastern side of the peninsula of Capoas, is about 19 miles deep in a south-easterly direction

varying in breadth from 2 to upwards of 4 miles in the broadest part. It is one of the finest harbours that can be desired, being almost perfectly free from hidden dangers, and containing along its shores bays and inlets capable of affording shelter to a large number of vessels. The entrance is occupied by Tuluran island, leaving only a narrow channel on either side and at about 7 miles within the entrance the sound is contracted by long projecting headlands from either shore, forming as it were a second strait, (containing several islands,) which opens into an expanse of water 9 miles deep and 4 miles wide, named the Inner sound, in which are the Spanish settlements Pancol and Baulao.\*

**CAUTION.**—Merchant vessels entering Malampaya sound in the early part of the south-west monsoon, particularly in the months of May and June, should be on their guard against pirates, for in Pirate bay, 4 miles within the entrance, H.M.S. *Royalist's* gig was nearly cut off in May 1851 by a fleet of eight Illañon prahus on their annual marauding expedition.

**Diente Point**, the north-western extremity of Capoas peninsula, is the western limit of the principal channel leading to Malampaya sound. Notch islet, 176 feet above the sea, lies immediately off it, and at  $1\frac{1}{2}$  cables northward of the islet is a reef of rocks awash.

**Tuluran Island**, occupying the entrance of Malampaya sound, is  $4\frac{1}{3}$  miles long, north and south, and  $1\frac{1}{2}$  miles broad. Two sharp peaks attaining a height of 1,272 feet, lie near the centre of the island, and there are several other peaks of considerable elevation on it; Tuluran Table, the southernmost, being 1,033 feet above the sea, and not unlike mount Capoas but smaller. The northern and western shores are bold, rocky, and precipitous in some parts, with conspicuous water-courses here and there.

At the north-western point of the island is a remarkable peaked islet, with two rocks awash a cable off it.

**Blockade Strait**, the channel southward of Tuluran may be said to have its entrance between Diente point and Bold head, a distance of  $2\frac{1}{4}$  miles. It takes a south-easterly direction, and at about 2 miles within the entrance is the narrowest part, 6 cables across. Beyond this the strait is about a mile wide for  $1\frac{1}{4}$  miles, when it opens into the outer extensive portion of Malampaya sound. Besides Entrance rock and White Round islet, two small islets with some rocks above water lie in the entrance, and there is a rock above water on the south side of the narrow part of the strait. The soundings in the narrowest portion of the strait are from 8 and 12 fathoms close to the points, 33 fathoms in the centre, and 20 fathoms within.

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\* See Admiralty plan:—Malampaya sound, No. 2,911; scale,  $m = 1\cdot5$  inches.

**Entrance and Pillar Rocks.**—Nearly two-thirds of a mile N.N.E.  $\frac{1}{3}$  E. from Notch islet, off Diente point, is a cluster of small rocks nearly 2 cables long, east and west, with depths of 16 and 20 fathoms close to. Pillar rock, 30 feet high, is the southernmost, and Entrance rock the easternmost.

**White Round Islet and Pyramid Rocks** lie off the western side of Tularan island. White Round islet is small, 80 feet above the sea, and lies W. by N. nearly  $1\frac{1}{4}$  miles from Bold head, with Entrance rock bearing S. by W.  $\frac{3}{4}$  W.  $1\frac{1}{4}$  miles, and Look-out hill, Blockade Strait, S.E. by S. nearly 4 miles.

Pyramid rocks, 50 feet high, and one quarter of a mile in extent N.E. and S.W. The highest rock lies N.N.E. nearly 2 miles from White Round islet, and three-quarters of a mile to the westward of Triple Head, the north-west point of Tularan.

The passage is safe between White round islet and Pyramid rocks, but between the latter and Peaked islet there is a coral patch with only 6 feet water on it, N.E.  $\frac{1}{2}$  N. one-quarter of a mile from the highest Pyramid rock.

**Cone Islet and Largon Rocks.**—A conical islet, 237 feet above the sea, lies in front of Bolalo bay on the south shore of Blockade strait and nearly midway between Notch islet, and Parmidiaran point, (a small conical head with a pillar rock over it) the south point of the narrowest part of Blockade strait. At a quarter of a mile N. by W.  $\frac{1}{3}$  W. from Cone islet, is a smaller islet named Largon, 130 feet high, from which rocks above water extend one-third of a mile to the northward, their outer extremity bearing E. by S.  $\frac{3}{4}$  S., nearly a mile from Entrance reef, with Malapina island S.E. by E.  $\frac{1}{2}$  E.  $4\frac{1}{3}$  miles.

**Bolalo Bay.**—There is a small bay immediately to the eastward of Diente point, and between its eastern limit and Parmidiaran point distant  $1\frac{3}{4}$  miles, is the entrance of Bolalo bay, a deep inlet affording good shelter from south-west winds. It is  $2\frac{1}{4}$  miles deep in a southerly direction, and about half a mile wide, the bottom being separated by a narrow isthmus from the north part of Inlulutoc bay.

Chinongab, a very sharp peak elevated 1,216 feet, with a small table ridge adjoining it, rises at nearly two-thirds of a mile within the eastern shores of this bay, and is the same distance from the shores of the bay to the north-eastward, and Pirate bay to the eastward.

The southern shore of Blockade strait beyond Parmidiaran point forms a bay,  $1\frac{1}{4}$  miles wide and one-third of a mile deep, the south-easternmost point of which has a reef awash, extending nearly a cable off, steep-to on the outside. The shoulder immediately over this point, named Look-out hill, is 400 feet above the sea, and has a paucity of trees upon it. It is in

lat.  $10^{\circ} 56' 10''$  N., long.  $119^{\circ} 16' 26''$  E. A small white rock lies in line between the extreme points of the bay, with 16 fathoms water close outside it.

**Endeavour Strait**, to the eastward of Tukuran island, has its southern entrance between Pillar Rock point and Endeavour point, rather more than three-quarters of a mile to the E.S.E. The strait runs nearly North and South, and is—including the passage inside a chain of islets and needle rocks, with numerous reefs awash, extending nearly 2 miles in a northerly direction from the north-east point of Tukuran—6 miles in length, and barely a cable wide in the narrowest part.

Coral fringes the shore on either side of the strait, and nearly in the centre of a bay on the west side, immediately under South Tukuran peak, is a rock awash at low water with 10 and 12 fathoms all round. From this rock, South Tukuran peak bears W. by N.  $\frac{1}{4}$  N., and Exerktion point, the eastern extremity of a bluff point forming the southern point of the bay, South,  $3\frac{1}{2}$  cables.

The soundings at the southern entrance of the strait are 19 and 20 fathoms, decreasing gradually to 9 and 10 fathoms towards Narrows, where they are 4 and 5 fathoms, mud.

There is a snug cove at the head of an inlet nearly a mile deep immediately to the northward of Endeavour point, in which it was afterwards supposed the pirate fleet was concealed when the *Royalist's* boats were in search of them in May 1851.

Endeavour strait ought not to be used by sailing vessels, as the winds are baffling, especially in the Narrows, from the high land on either side.

**Pirate Bay.**—Between Blockade strait and the second or inner entrance, the western shore of the sound has three deep bays, in each of which the ground is quite clear, and shelter is afforded from all winds; but the two southern bays have no watering places. The shore on the opposite side, except in fine weather, has generally a little swell breaking on it, setting directly in through Blockade strait, and in the bay under the high land in the north-east corner, are some islands and white rocks.

Pirate bay, the northernmost of the three bays just mentioned, will be found the most convenient to vessels not bound to Pancol, but merely requiring shelter, wood, or water. It lies between the projecting point, upon which is Look-out hill, to the north-westward and Tenabian island to the south-eastward, the bay about three-quarters of a mile wide, the same deep, and its shores are clear all round at half a cable off. The depths are 15 and 16 fathoms at the entrance, 14 fathoms in the middle, and 7 and 9 fathoms close to the head of the bay.

**Water.**—The watering place, affording a good supply, is at the head of Pirate bay almost immediately under Chinongab peak. Vessels can lie

half a mile off it in the centre of the bay in 14 fathoms, stiff mud, perfectly land-locked.

**Tenabian Island**, 325 feet high, is nearly two-thirds of a mile long in a N.E. and S.W. direction, the north-east portion of the island having an extreme breadth of nearly half a mile, and the south-west portion a regular breadth of about 200 yards. The passage inshore of the island is 2 cables across, but there is a reef in it which covers.

**Malapina Island**, fronting the inner part of Blockade strait, is small, 156 feet above the sea, and lies a mile to the eastward of Tenabian, with the northernmost point of Tacbolo island bearing S.  $\frac{2}{3}$  E.  $2\frac{1}{4}$  miles.

**Boat Rock**.—Lies just within the entrance of N.E. bay, E.  $\frac{1}{3}$  S.  $1\frac{1}{4}$  miles from the highest point of Malapina island, and South nearly half a mile from the south point of N.E. Bay island. The ground is somewhat foul for  $1\frac{1}{2}$  cables south-westward of this rock.

**Tacbolo Island**.—In the inner strait which is  $3\frac{1}{2}$  miles long in a south-easterly direction, and about  $2\frac{1}{2}$  miles wide, are several islands, the north-westernmost of which is Tacbolo, 300 feet above the sea, partially cleared, and nearly a mile in length N.W. and S.E. It lies in mid-channel between the heads at the entrance of the strait. Between it and Passage island on the east and Pugguianan point, a headland with a triple summit 380 feet above the sea, on the west, is the principal passage leading into the Inner sound.

**Calabuctung Islets**.—Between Wedge head, the north point of Tacbolo, and the headland on the east side of the strait, at nearly two-thirds of a mile from the former, is the large Calabuctung islet, and at one-third of a mile to the north-westward, or outside of it, is the smaller islet of the same name.

These lie off the entrance of a deep bay formed on the south side by Passage island, and in which there are from 4 to 7 and 9 fathoms, but it is convenient only for boats making a short cut to Pancel.

**Passage, Eniaran, and Durangan Islands**.—Passage island, the largest in the strait, is 3 miles in circumference, and is separated from the south-east point of Tacbolo by a channel only one cable wide, in which there are 5 fathoms, and from Tuluan hill, the middle point on the eastern shore, by a boat channel barely three-quarters of a cable wide.

A small islet, named Eniaran, with a flat rock on its west side, lies close off the western point of Passage island, and off the western point of a small bay on the south side of the island is a white rock named Balolo. Durangan, a round island 386 feet above the sea, and rather more than half a mile in length, east and west, with two small black rocks at the eastern extremity, occupies the centre of the channel between the south-

west side of Passage island and Balulu point, the northern extremity of a chain of hills projecting to the northward from the southern shore of the strait.

The channel between Passage and Durangan islands is nearly half a mile wide; Cancea rock on the north-east side of the passages, is the only danger known that is not visible.

Southward of Durangan island the channel is the same width, and has depths of 9 and 12 fathoms, mud; nearly in the centre is Colnhogon, the westernmost of two small islands 4 cables apart in about an E. by S. and W. by N. direction. Bartoc, the easternmost, has a reef extending half a cable from its south-western side.

**Cancea Rock**, the above-mentioned danger, consists of a coral ledge nearly awash in some parts at low water, fronting the head immediately to the westward of the small bay on the south side of Passage island, from which it extends nearly 2 cables with 11 and 12 fathoms close to its edge. From its outer extremity, Flat rock, off Eniaran islet, is in line with Chinongab peak bearing N.W., and the outer black rock off the east end of Durangan island S.S.W.  $\frac{1}{2}$  W.

**Mallaratoe and Ibelbel Islands.**—S.E. by E.  $\frac{1}{4}$  E. nearly a mile from the east end of Durangan, and two-thirds of a mile southward of Canica point, the south point of Passage island, is Mallaratoe island, nearly half a mile long, in a N.E. and S.W. direction, with an average breadth of about 200 yards. A small white pillar rock lies nearly a cable off its south-west point.

Ibelbel island, about 200 yards in diameter, partially cleared, and having a quantity of bamboo growing upon it, lies on the northern shore of the strait at the entrance of a bay of which Passage island forms the west side. It lies E.  $\frac{1}{2}$  S. three-quarters of a mile from Canica point, and N.E.  $\frac{1}{2}$  E. about the same distance from Mallaratoe island, with clear channels between.

**Damao, and Vinalo Islands**, the south-eastern limits of the inner strait, lie N.E. by N. and S.W. by S.  $1\frac{1}{2}$  miles from each other. Damao, 226 feet high, and nearly three-quarters of a mile in length N.W. and S.E., is on the southern shore S.S.E.  $\frac{3}{4}$  E. three-quarters of a mile from Mallaratoe island. A peaked islet, 83 feet high, lies off its northern extremity, and in the channel a quarter of a mile wide separating Damao island from a headland on the south, are some small islets and rocks awash. Vinalo is about 300 yards long north and south, and 180 yards broad.

**Mallarois Island**, E.  $\frac{1}{2}$  N. nearly  $1\frac{1}{2}$  miles from the north point of Mallaratoe, and S.E. by E.  $\frac{1}{2}$  E. three-quarters of a mile from Ibelbel, is

93 feet above the sea, less than 200 yards in length, and has a precipitous cliff on the south side with some rocks detached from the east end.

The channel between Mallarois and Vinalo island north of it, is 2 cables wide, and said to be safe.

**Alligator Bay** is the northernmost of two large bays on the southern side of the inner strait, and, next to Pirate bay, the most convenient place in the sound for watering. Durangan and Palcocotan islands are immediately off the entrance, which is between Green head and Balulu point. Alligator island lies on the opposite side of the bay. South of the watering place, and to the south-eastward of it is a double cone island.

The soundings at the entrance of the bay are 10 and 12 fathoms, mud, decreasing gradually to 3 and 4 fathoms near the shore.

**Water.**—In the south-east corner of the bay the main stream from mount Capoas discharges itself through some low ground, but the watering place is on the north shore of the bay, in the first small indentation from Green head.

**Malipu Bay** is separated from Alligator bay by the chain of hills of which Balulu point is at the northern extremity, and it has its eastern limit at Damao island. A remarkable hill, 454 feet high, rises on the south-eastern side of the bay, and on the western shore is Chinicaran island, with an isthmus head on the north face, the passage between which and the shore has only 12 feet water in the narrowest part.

Mount Capoas and the adjacent high land rise directly behind these bays, and it was from the mouth of a small stream just to the westward of Chinicaran island that the party who ascended Capoas set out; keeping the course of the main stream they advanced by a steep granite gorge on the face of the mountain, which is everywhere conspicuous from the north side of the sound.

The soundings in Malipu bay average about 6 to 8 fathoms decreasing gradually to 2 fathoms towards the shores of the bay.

**Pancol.**—The Inner sound of Malampaya opens immediately beyond Damao and Mallarois islands, and in a bay on the northern side,  $1\frac{1}{2}$  miles from the latter, is the Spanish settlement of Pancol, prettily situated under the high land, and fronted by a green isolated hill, 65 feet high, on which is built a stockade in latitude  $10^{\circ} 52' 9''$  N., longitude  $119^{\circ} 22' 56''$  E. The natives are exceedingly friendly, and for supplies it is certainly the best place on the coast. A stream of fresh water runs on either side of the stockade hill, and water can be procured, but not readily in ships' boats. Fish is plentiful.

Vessels can anchor off Pancol in 3 fathoms, stiff mud, within a quarter of a mile S. by W. of the stockade, or in deeper water farther off, as convenient, the anchorage being safe in all seasons.



**Tides.**—It is high water, full and change, at Pancol at 9 h. 40 m.; springs rise 6 feet.

**Malampaya River** disembogues at the bottom of a shallow bay on the eastern side of the sound 3 miles from Pancol. A high round island named Malootone, (with a small conical head at the south end, and an island on either side) lies across the entrance of this bay, leaving a channel into it little more than 2 cables wide, in which there are only 13 feet water. Off the first point inside these islands is a white rock, and across the entrance of the river is a line of stakes commanded by a small stockade in which a guard is usually kept. At low water the mud dries considerably outside this, nearly abreast of two small islands on the south side of the bay.

The river, which is navigable for boats about 2 miles, runs in a southeasterly direction; near its head is a good foot-path leading to the village of Tai-Tai, on the opposite side of the island, a distance of 2 miles.

**Baulao**, a settlement similar to that of Pancol, but smaller, lies on the eastern shore near the head of the sound, S.S.E.  $\frac{1}{2}$  E. nearly  $6\frac{1}{2}$  miles from Pancol. It cannot, however, be approached within 2 miles by a vessel drawing more than 12 feet water, as the sound shoals gradually from 3 fathoms at 4 miles southward of Pancol to the head, where, at low water, the mud dries out nearly to Bay or Bivouac islet, a mile from the mangroves.

Immediately to the southward of Baulao, the hills at the head of the sound on either side recede, and are separated by a large plain which extends through the island, almost to the opposite coast, some of the water of which is discharged into Malampaya sound by a river having its outlet through the mangroves, close to Bush head, nearly 3 miles South of Baulao.

There are several detached ranges on this plain; on the west, those overlooking Imuruan bay and in the neighbourhood of port Barton are recognisable.

The western shore of the sound to the southward of Damao island is indented by bays, all of which are shoal.

The average depth in the centre of the Inner sound is  $6\frac{1}{2}$  fathoms, mud, from which it shoals gradually on all sides, except towards the entrance, where it deepens to 9 and 10 fathoms.

**Alleged Danger.**—In an old MS. chart, which was seen at Tai-Tai, there is a rock named Coloma laid down nearly in the centre of the Inner sound. The late Captain Bate tried for three consecutive days to find it, without success, and the people of Pancol and Baulao denied having any knowledge of its existence. As near as could be ascertained

from the Spanish chart, the position of the rock is about 3 miles S.  $\frac{1}{2}$  E. of Pancol stockade.

The northern extremes of Mallarotone and Durangan islands kept in sight, will prevent a vessel going near this position.

**Directions.**—In making the entrance of Malampaya sound from the westward, Notch islet shows conspicuously off Diente point, White Round islet will be seen, and on a closer approach the Entrance and Largon rocks, which are always above water, become visible. The best course is between these rocks and White Round islet, the soundings in the neighbourhood of which average about 30 fathoms, and the former may be passed on the north side as near as convenient. With a southerly wind Largon rocks should be kept close aboard to enable a vessel to fetch through the narrowest part of Blockade strait, and to prevent being set over upon the northern shore by shifts of wind from the high land about Chinongab. Having passed Parmidarian point proceed just outside the small white rock in the centre of the next bay; and the reef awash off the point under Look-out hill, having 13 fathoms close to, may be passed at a convenient distance; then steer for the anchorage in Pirate bay.

Entering the strait with a north-east wind, pass on either side of White Round islet, and conform to the same directions as before, only keeping on the Tuluran shore, but not too close, or the vessel may get becalmed, from the high land there rising more abruptly than on the south side.

The passage through the second strait into the Inner sound is on the south-west sides of Tacbolo and Passage islands, and in using it great care must be taken to avoid the Cancea ledge of rocks under water between the latter island and Durangan.

**The COAST** to the northward of Tuluran island, at the entrance of Malampaya sound, trends northward for nearly 5 miles, where, near Custodio point, the extremity of a promontory which forms the western shore of Bacuit bay, is a remarkable quoin hill, 466 feet above the sea. The intermediate coast is of a bold rocky aspect, with several land-slips appearing as vertical reddish-looking stripes down the face. The southern part of this portion of the coast is indented by two bays adjoining each other; the southernmost of which, port Cataaba, half a mile wide at entrance, runs  $2\frac{1}{2}$  miles in a south-east direction, and is shallow, but affords good anchorage for small vessels in 6 and 7 fathoms. Rocks front the western point of entrance to the extent of  $1\frac{1}{2}$  cables. The northernmost bay extends about a mile to the north-eastward, with 4 fathoms water at its head, and rocks projecting 2 cables from the south shore.

**Water.**—At nearly three-quarters of a mile to the northward of Ragged islet, at the north point of entrance to this latter bay, in a small shingle cove named Calver cove, is a good supply of fresh water.

**Saddle and Camago Islands** front the above bays and are the northernmost of the chain of islets and rocks in the north entrance of Endeavour strait (page 211). Saddle island, the outermost, is in appearance what the name imports. A reef awash lies E.  $\frac{3}{4}$  N. nearly a quarter of a mile from its northern summit, and rocks lie off the west face. Almost joining it to the southward is Camago, a precipitous cliff island, with several rocks awash and above water extending one-third of a mile to the southward towards the Needle rocks and Anato island.

Tolerable shelter from south-west winds will be found to the eastward of Camago and Saddle islands, in 16 or 17 fathoms, stiff mud, care being taken to avoid the reef awash to the eastward of the latter.

**Tent Islet**, surrounded by rocks awash, with a reef 3 cables northward of it, lies  $1\frac{1}{4}$  miles from the coast and nearly North  $1\frac{1}{4}$  miles from Saddle island, with 15 and 23 fathoms between.

It is recommended not to pass eastward of Tent islet, as the ground is evidently foul, and broken water has been reported.

**RUGGED LIMESTONE GROUP.**—From Custodio point, the extremity of the promontory above mentioned, a remarkable group of rugged islands, of limestone formation, extends  $8\frac{1}{4}$  miles in a N.N.W. direction. The sides of these islands present bare perpendicular cliffs of every variety of tint, with numerous stalactitic caves, in which the edible bird's nest is sought. The summits terminate in small clusters of needle peaks, and wherever it is possible for vegetation to take root, they are luxuriantly clothed with foliage, of which the pandanus predominates. These, contrasting strongly with the dark-coloured rock and white sandy bays in some of the secluded nooks, impart to the group scenery of a peculiarly picturesque nature. The bases of all the islands are worn by the action of the sea water, undermining in some parts the perpendicular upwards of 15 and 20 feet, thus rendering it almost impossible except here and there where a slip or disruption occurs, to land on any part of them.

All the islands are safe to approach, having generally upwards of 20 and 30 fathoms close to the cliffs. In their vicinity the soundings vary from 20 to 30 and 40 fathoms, stiff mud.

**Guntao Islands.**—North and South Guntao islands, the southwesternmost of this group, lie North  $8\frac{1}{4}$  miles from White Round islet, at the entrance of Malampaya sound, and  $4\frac{1}{2}$  miles to the westward of Custodio point. They are 2 cables apart, and the passage between is blocked with coral.

North Guntao is of a reddish barren aspect, one mile long, and barely 200 yards wide in the centre, with a conical mount near the highest part

Rocks, out of water, extend one cable from the north-west point, and off the southern extreme of the island are some of a high pinnacle form.

South Guntao is the larger and higher of the two, and has a sloping summit, the south point of the island terminating in a narrow rocky cliff.

**Vestacado Rocks**, showing like two small boats, lie W. by S.  $\frac{3}{4}$  S.  $1\frac{1}{2}$  miles from the opening between the Guntao islands, and on this bearing the Bold head of Mantinloc appears in the passage.

The soundings near these rocks are 18 and 19 fathoms. The Guntao islands have in some places upwards of 20 and 30 fathoms close to.

**Tapiutan**, the outer island of the Rugged group, having its summit in lat.  $11^{\circ} 12' 50''$  N., long.  $119^{\circ} 15' 18''$  E., lies 7 miles from the shore, and N. by E. 5 miles from the Guntao islands. It is nearly  $2\frac{1}{2}$  miles long N.N.W. and S.S.E., the highest part, which is round topped, being 1,415 feet above the sea. A low neck separates this from another round hill to the northward, 670 feet high, the north-western extremity of which terminates in an isthmus head, with a precipitous fall to seaward. The shore of the island is bold all round, and there is a triple summit immediately over the southern part.

**Matinloc Island**.—East of Tapiutan, and separated from it by a channel  $1\frac{1}{2}$  miles long, but only 2 cables wide, in which there are 20 fathoms water, is the northern half of Matinloc, an island formed by a very narrow ridge of limestone, nearly  $4\frac{3}{4}$  miles in extent, in a N.  $\frac{1}{2}$  W. and S.  $\frac{1}{2}$  E. direction, and almost separated in three places by deep gaps.

The Horn, 1,250 feet above the sea, rises nearly in the centre of the island, and when viewed in a northerly or southerly direction, assumes the appearance of its name, forming a most conspicuous and readily recognizable feature on making the coast. There is a sandy bay immediately under the Horn on the east side of the island, 3 cables south of the point off which is a rock islet close to the shore.

Between Bold head, the southern extremity of Matinloc, and the Guntao islands the channel is  $1\frac{1}{2}$  miles wide, and has depths of 24 and 30 fathoms water.

**Ynambuyod Island**, lying on the north-east side of and parallel to Matinloc, is separated from it by a deep channel one mile wide; this island, similar in feature to Matinloc but smaller, being only  $1\frac{1}{4}$  miles long. Two islets, Cliff and Crown, lie respectively  $1\frac{1}{2}$  and 9 cables from its northern extremity, with 17 and 20 fathoms between them. There is also a remarkable rock lying one-quarter of a mile off its south-eastern face, named the Mushroom, from its being poised on a narrow stem about one-third the diameter of the whole base.

**Miniloc Island** lies to the eastward of the southern part of Matinloc, the channel between, in which there are upwards of 25 fathoms,

being  $1\frac{1}{4}$  miles wide. It is a remarkable high rugged island,  $3\frac{1}{2}$  miles in circumference, with several summits and precipitous crags, the coast nearly all around being broken up into sharp cliffy heads, and, on the south side exceedingly picturesque bays. On the north-west face are two high rocky islets, the southernmost and largest of which is cleft in two to the water's edge.

**Pacluyaban, Entalula, and Pangutasian Islands.**—On the southern side of Miniloc island, nearly connected with it by a smaller island, which occupies the passage, is Pacluyaban, also of limestone formation, and very precipitous. Between the latter island and Custodio point are two islands; Entalula, similar in character to the above, and Pangutasian, of entirely different feature.

Pangutasian island has a double summit, and slopes gradually towards the south-east point, where there is a sandy tongue, from which a reef projects in a south-westerly direction, contracting the channel between the island and the Custodio shore, off which latter is Flat rock, to 3 cables across. The depth in this channel is 14 and 16 fathoms.

On the eastern face, 3 cables from Pangutasian, is Popolcan, a limestone islet 310 feet above the sea.

**Guintungauan Island, and Jip Rocks.**—Guintungauan island E.  $\frac{1}{2}$  S.  $2\frac{3}{4}$  miles from the south point of South Guntao, and W. by N. nearly  $1\frac{1}{4}$  miles from Custodio point, is a quarter of a mile long, and appears like a square block when seen in a North and South direction.

The Jip rocks are of limestone, 95 feet high, cleft in two, and lie N.E. by N. half a mile from Guintungauan island, and one mile to the westward of Pangutasian.

**Water.**—A reef, which always shows, extends one cable from Custodio point, and in a small bay fronted with coral between it and Flat rock, is a stream of fresh water.

**BACUIT BAY**, formed partly on the west by the islands just described, is 9 miles deep, and 3 miles wide at entrance between Miniloc island and a limestone peninsula, the highest part of which, named Bacuit peak, is tolerably sharp, and attains an elevation of 1,500 feet above the sea. The eastern shore trends nearly north and south, and is overlooked by a high range, extending in a northerly direction. This range, on which there are some curiously-shaped peaks, forms part of a great vein of mountain limestone that here traverses the island in a north-westerly and south-westerly direction, commencing on the west side of Palawan at Tapiutan and Cauayan islands, just embracing both shores of Bacuit bay, and terminating on the east coast at Old Castle point and the islands fronting Tai-Tai bay (see page 243), altogether a distance of 30 miles. The average breadth of the vein appears to be about 7 miles.

There are several islands in the bay, all of which are precisely similar in feature and character to the group outside. Its shores are generally fringed with coral, extending from one to 3 cables, and at one place half a mile off, on which, in the more sheltered parts, large quantities of fucus grow. With one exception, there appear to be no dangers in the bay but what are visible. The soundings at the entrance are about 24 fathoms, decreasing gradually as the head of the bay is approached to 3 and 4 fathoms, stiff mud, close to the coral.

**Ynabuyatan and Malpacao Islands.**—Ynabuyatan, the northernmost island, facing the eastern shore of the bay, is a very conspicuous object on entering, being 1,130 feet above the sea (somewhat resembling the appearance of an elephant on its haunches), and nearly a mile in circumference. It lies immediately a small but apparently deep bay, almost blocked up by reefs.

Malpacao, a remarkable ridge of limestone, with a high boulder detached from it, assuming the form of a double island, lies S.S.E.  $\frac{3}{4}$  E. nearly a mile from Ynabuyatan, midway between the southern point of this bay and Lagen island, and has a passage on either side; that to the eastward, in which there are 9 fathoms, being contracted to the width of 2 cables by reefs projecting from both shores.

**Lagen Island**, 1,140 feet above the sea, the southernmost and largest of the three islands on the eastern side, is of irregular form,  $1\frac{1}{2}$  miles in length N.W. and S.E., and presents a bold cliffy shore upwards of 400 feet in perpendicular height, with several sandy bays. There is a narrow channel between it and the nearest shore, with a dry sand-bank in the centre.

Midway between the southern extreme of Lagen island and Long point is a coral patch nearly awash, lying three-quarters of a mile from the shore; but it is too far up the bay to be of consequence.

**Comocutuan and Dibuluan Islands** lie on the western side of the bay. The former, a small precipitous island rising 298 feet above the sea, lies S.E. by E.  $1\frac{1}{2}$  miles from Pangutasian island, and between it and the shore abreast, distant upwards of a mile, a spit projects three cables from an islet with a white rock close-to. Dibuluan island is S.S.E.  $\frac{1}{2}$  E. 2 miles from Comocutuan, and about midway between it and Lagen are three rocky islets, the easternmost of which shows like a nine-pin on entering the bay. The other two islets are almost connected by reefs projecting from their eastern sides.

In the bay, immediately to the southward of the first remarkable limestone head between Comocutuan and Dibuluan, the coral extends half a mile off, where also there is a rock awash at half tide, 2 cables from the mangroves.

There is a narrow passage with a depth of 10 fathoms, between Dibulan and the shore, but from the south-eastern extremity of the island reefs extend nearly to Claudio point S.E. by S. rather less than a mile from it.

**Manlalec** is a small village, situated a short distance up a rivulet, half a mile inside the southern point of the small bay, off which is Ynabuyatan island, on the eastern shore of Bacuit bay; the approach is commanded by a stockade at the entrance mounting three guns.

The old and now deserted village of Bacuit is in the extreme south-eastern corner of Bacuit bay, fronted by a mud flat dry at low water.

**Tides.**—It is high water, full and change, in Bacuit bay, at 10h.; springs rise about 6 feet. Little or no current has been observed in the bay.

**Directions.**—The best channel for small vessels proceeding to Bacuit bay, if coming from the southward, is between Entalula and Pacluyaban islands. It is 6 cables wide, and has 25 fathoms in it, with 20 fathoms close to the shore on either side.

The best anchorage in the south-west monsoon is in 17 or 18 fathoms, stiff mud, about a mile to the south-eastward of Comocutuan island, off the first limestone head; but as neither fresh water nor supplies are to be had readily, there is little inducement, except it be shoaler water, for vessels to go farther up; and should the wind blowing strong veer to the westward, they would probably experience some difficulty in getting out of the bay against the heavy swell which invariably accompanies it.

**CADLAO**, or Table-Top island, 2,000 feet above the sea, lies immediately to the north-west of Bacuit peninsula, being separated from it by a channel barely 3 cables wide, in which there are 17 and 19 fathoms close to the points, and it may almost be considered as a continuation of the north side of Bacuit bay; while Tapiutan and Matinloc are regarded as forming the southern extremity of it.

Cadlao is  $3\frac{1}{4}$  miles in length, in a N.N.W. and S.S.E. direction, with an average breadth of about half a mile. Its features are very remarkable, and it forms the most conspicuous object when making the northern end of Palawan.

The table rises in the centre of the island, to the eastward of which, and separated from it by a deep gorge, are two remarkable peaks, of nearly equal elevation, named East and West Loggerheads. The island, especially on the southern and eastern sides, exhibits all the characteristic features of the contiguous group, some of the cliffs overhanging the perpendicular to a considerable extent.

There is a bay on the north side of the island immediately under the table, with an islet in it named Mitre; and on the south-west face, 4 cables distant from the shore, is Ymbalaba island, three-quarters of a mile in

extent, North and South, the channel between the two having 11 fathoms water.

Shelter in north-east winds may be found to the eastward of this island, south of the table, in 16 or 20 fathoms, stiff blue mud.

**Cauayan and Cavern Islands.**—North of Cadlao, and separated from it by a channel about half a mile wide, in which is a peaked islet, is Cauayan island, 827 feet in height, and  $1\frac{1}{4}$  miles in extent about N.W. by N. and S.E. by S. It is of similar formation to the neighbouring islands, but has a more even summit.

On the north-west face of Cauayan, and distant a quarter of a mile from it, is Cavern, a small island, the extreme of the group. It is 350 feet high, and when viewed in an east or west direction has a tall pillar rock rent from the north end. Reefs awash extend one cable from the south point of the island, and there is also a detached rock, about 30 feet in height, on the east side.

**Anchorage.**—Good shelter from south-west winds is to be had on the north side of Cadlao, off Mitre islet, in 17 fathoms, stiff mud ; or if desirable, nearer to the village of Bacuit, in from 9 to 12 fathoms, either abreast of Abrupt head, the north-easternmost point of Cadlao, or Santiago islet, a mile farther to the southward and close off the east face of that island.

**Tides.**—It is high water, full and change, at Cavern island, at 9 h. 30 m.; springs rise (one observation only),  $5\frac{1}{2}$  feet.

**BACUIT.**—Cadlao and the islands just described form the western side of a deep bay, in the southern extreme of which is the new village of Bacuit, called also by the natives Ta-lan-dac, in a sandy bay on the north side of the peninsula forming the northern extremity of Bacuit bay. In 1851 it contained a population of 200, exclusive of women and children, all Roman Catholics, under the jurisdiction of the Alcalde at Tai-Tai.

The soundings at the entrance of the bay, and off Cavern island, vary from 20 to 30 fathoms, decreasing gradually to 12 and 14 fathoms to within half a mile of the shore ; towards the village of Bacuit it shoals to 3 and 4 fathoms close to the edge of the coral.

**Supplies.**—Goats, pigs, fowls, vegetables, &c., in a moderate way, may be obtained from the natives, for which, as usual, they ask an exorbitant price ; but a more equitable bargain may be made by giving articles of wearing apparel, crockery, hardware, &c., &c., in exchange.

Water may be procured from a stream at the eastern end of the beach, but not with any degree of facility.

**The COAST** trends in a northerly direction from Bacuit for 8 miles to Crawford point. A central range, the continuation of that over Bacuit bay, overlooks both shores of Palawan, and in the parallel of Cadlao, where



it attains the greatest elevation, is a high table, the north-western and south-eastern shoulders of which are  $1\frac{1}{4}$  miles apart, and are respectively 2,055 and 2,230 feet above the sea.

There is a sharp peak, 1,630 feet in height to the southward, and several hills of less elevation bordering the coast, the features of which are entirely different from those of the limestone formation, and this is nowhere so evident as at the back of Bacuit village, where a sudden transition occurs.

East peak, attaining a height of 1,890 feet above the sea, rises  $4\frac{1}{2}$  miles to the north-eastward of the high table, but it is not generally observable from the west side until some distance off shore. It, however, forms a conspicuous object when to the northward and eastward of the north end of Palawan.

**Emmit**, a small wooded island, 170 feet high, with two remarkable pillar rocks at the north extremity, lies 2 cables from a projecting point, midway between Bacuit and Crawford point, and eastward of the channel separating Cadlao and Cauayan islands.

The coast to the northward, on which is a small sugar-loaf hill, is bold to approach, having 6 and 10 fathoms close to the shore; but that to the southward is fronted with coral, and should not be closed nearer than half a mile.

**Water.**—Rocky ground extends half a mile from the point opposite Emmit island, and in the first bay to the southward of it was a rivulet of fresh water in May, 1851.

**NORTH COAST of PALAWAN.**—Abreast Crawford point the island of Palawan is 8 miles wide, and from this, as well as Darcotuan point, corresponding to it, on the east coast, the island gradually contracts, forming at the northern extremity a promontory  $3\frac{1}{2}$  miles long, and  $1\frac{1}{2}$  miles wide. Near the termination of this is a hill 493 feet above the sea, with some table-looking land of greater elevation to the southward.

Two rocky islets lie immediately to the northward of Crawford point, from which a long sandy beach extends  $1\frac{1}{2}$  miles in an N.N.E. direction to a headland, one mile to the eastward of which is Pasco inlet, a mile deep, with 2 or 3 fathoms in it.

**Lalutaya Island and Gemeles Islets.**—Off the sandy beach, and N. by W. nearly one mile from Crawford point, are the Gemeles, two white-looking rock islets: and N.  $\frac{1}{2}$  W.  $2\frac{1}{4}$  miles from Crawford point, and separated from the headland above mentioned by a channel  $1\frac{1}{4}$  miles wide, in which there are 9 and 10 fathoms, sand, is Lalutaya island,  $1\frac{1}{4}$  miles long, 407 feet above the sea, and—except on the eastern side, where fronting two small sand bays some coral extends 2 cables,—is bold to approach.

**Diaphila and Calitan Islands.**—On the north side of Base bay, which lies immediately to the northward of Pasco inlet, and  $2\frac{1}{2}$  miles N.E. by E. of Lalutaya, is Diaphila island, lying a mile from the shore, with a safe channel inside. Calitan island, 256 feet high, lies N. by E.  $\frac{1}{2}$  E. nearly 2 miles from the latter, and nearly half a mile westward of the northern extreme of Palawan. There is a sharp double rock between it and the shore.

On the south side of an indentation on the coast between these islands, is North hill, 965 feet high.

**Cabuli Island**, the highest part of which is in lat.  $11^{\circ} 26' 25''$  N., long.  $119^{\circ} 29' 46''$  E., lies off the north end of Palawan, and, except when seen in a north-west or south-east direction, appears to form part of that island, the channel separating them, in which there are 7 and 9 fathoms, being only 3 cables wide. It is  $1\frac{1}{2}$  miles in extent from north to south, 560 feet in height, and has rather a flat summit, the northern extremity of the island terminating in a small head, with 17 fathoms water almost alongside. It is also bold to approach on all sides, the soundings in the immediate vicinity being about 20 fathoms.

**Soundings.**—The soundings off the north part of Palawan are about 30 fathoms, mud, near the islands, and from 40 to 50 fathoms, sand and green mud, towards the edge of the bank. Occasionally shoaler casts, on sand and coral may be anticipated.

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## CHAPTER XI.

### EAST COAST OF PALAWAN ISLAND.

VARIATION 1° 20' East in 1879.

IN giving sailing directions, and a description of the east coast of Palawan, it is to be borne in mind, that although they may be found sufficiently succinct and accurate to meet the ordinary requirements of navigators, they are, nevertheless, but the result of a few observations hurriedly collected in a run down the coast during the summer, and a beat up in the winter months of 1850, taken with a view to ascertain the practicability of adopting this route to China, in preference to the usual passage on the west side of Palawan, when late in the monsoon. They are not, therefore, implicitly to be relied upon, as resulting from a well-executed survey; nor are they intended in any way to lessen the necessity of keeping that vigilant look-out which the navigation of coral seas, on all occasions, urgently demands.

The adoption of the Palawan passage, in preference to the route on the east side of the island, is recommended as the result of Captain Bates' experience.

In the strength of the north-east monsoon, vessels may, taking the latter route, reach as far as the parallel of 10° N., or the island of Dumarán, without very great difficulty; but to get beyond this they will experience at least considerable delay, even if they succeed at all, for the current in this season sets strong to the southward, between Palawan and the Cuyos islands, the velocity being almost in direct proportion to the strength of the wind. H.M.S. *Royalist*, in the month of December, was delayed 15 days, vainly endeavouring to get round Dumarán against the monsoon, and had, after all, to make the passage into the China Sea, *viâ* Panay and Mindoro.

The currents on the east coast depend chiefly on the prevailing winds.

The flood tide sets along the shore to the southward, and the ebb to the northward. The maximum velocity observed was  $1\frac{1}{2}$  knots, and the rise 7 feet.

**The COAST** to the northward of Bugsuk island (page 177) has been only partially surveyed; and that part between Rawnsley and Madripore points, a distance of 5 miles, is merely sketched in, and no soundings have been taken near it. It is low, consisting chiefly of mangrove.

At  $2\frac{3}{4}$  miles beyond Madripore point is Deception point, and at 5 miles

farther to the eastward is Church point, having two wooded hills to the north-east, and a reef which dries off  $1\frac{1}{4}$  miles to the south-east. In the coast between the latter points are two openings with 4 and 6 fathoms water in them.

**Ursula Island**, in lat.  $8^{\circ} 20' 42''$  N., long.  $117^{\circ} 29' 56''$  E., lies with the north point of Bugsuk bearing East  $12\frac{1}{2}$  miles, and Church point N. by W.  $9\frac{1}{2}$  miles. It is one-third of a mile in length, low, covered with wood, and surrounded by sand. The south side is steep-to; but a reef, dry at low water, extends from the northern part of the island, nearly a mile in a north-east direction.

At  $2\frac{1}{2}$  miles N.W. by W. from the summit of Ursula island, is a  $2\frac{1}{2}$ -fathoms coral patch; and there is also one with apparently very little water, N.  $\frac{3}{4}$  E.  $4\frac{3}{4}$  miles from the same, the soundings between varying from 14 to upwards of 40 fathoms.

To the south-eastward of Ursula the soundings, when 7 miles from the island, are about 70 fathoms, fine sand, with patches of 8 and 9 fathoms, coral, occasionally nearer to the shore.

Vessels should keep outside Ursula island.

**Tides.**—It is high water, full and change, at Ursula island at 11 h.; springs rise  $7\frac{1}{2}$  feet.

**Wright Shoal**, situated E.  $\frac{1}{2}$  S. 9 miles from Ursula island, is  $1\frac{1}{4}$  miles long east and west, and half a mile broad, with 10 feet on its shoalest part and 47 to 70 fathoms close around.

**Reef Island** lies N.W.  $\frac{1}{2}$  N.  $7\frac{3}{4}$  miles from Ursula island, and  $3\frac{1}{4}$  miles from the shore, from Reef island, coral projects in every direction; that to the eastward, to the extent of  $1\frac{1}{4}$  miles, where a bank dries at low water. There are 12 and 13 fathoms close to the edge of the coral, and 17 and 20 fathoms with some reefs and dry sand patches between it and the shore of Palawan.

From Reef island towards the end of the spit off Bowen island the ground is foul, and also for upwards of 3 miles in the direction of Ursula island, with 15 and 20 fathoms close to the dangers.

**Pirate Island**, less than 2 cables in extent, lies N.E.  $\frac{3}{4}$  E.  $5\frac{1}{2}$  miles from Church point and  $1\frac{3}{4}$  miles from the shore. A reef extends nearly three-quarters of a mile from it in an E.S.E. direction; and there is a patch of coral with 3 fathoms over it, lying S.S.W.  $\frac{1}{4}$  W. nearly a mile from the island.

**ROCKY BAY** is immediately under the Panalingahan range, noticed on page 184, and has its southern limit about  $5\frac{1}{2}$  miles N.N.E. of Church point. Three small rivers disembogue on the western shore of the bay, the northernmost of which has some houses near the entrance, probably a piratical establishment. There is also another stream with a large store-

house near it, 3 miles farther to the eastward, and close to the north-east point of the bay.

The soundings, when from 5 to 6 miles from the coast on either side of Rocky bay, are very irregular, varying from 7 to 20 and 30 fathoms, having apparently long ridges of coral, with 4 to 7 and 10 fathoms over them, extending almost across the bay.

**Outer Four-Fathoms Patch.**—The shoalest and outermost of the above patches that has been discovered has 4 fathoms on it, and lies with Pirate island W. by N. 6 miles; Ursula island S.E.  $\frac{3}{4}$  S.; Church point E. by S.; Wood hill, the northernmost and highest of the three that overlook the Pirate island shore, W. by N.  $\frac{3}{4}$  N., and Mantaleengahan mountain N.  $\frac{1}{3}$  E.

**Gull and Egg Sands**, nearly 2 miles apart, with dry patches on them, lie in the entrance of Rocky bay; the former N.E. by E.  $\frac{1}{2}$  E.,  $2\frac{1}{4}$  miles, and the latter N.E.  $\frac{2}{3}$  E. nearly  $4\frac{1}{4}$  miles from Pirate island. When inside these sands the depths decrease gradually from 22 to  $4\frac{1}{2}$  fathoms, stiff mud, towards the head of the bay.

Off the reef that lines the western shore of the bay there are some rocks and dry sand patches, the largest of which, a mile in extent, lies 2 miles north of Pirate island, and one mile from the shore.

**Segyam Islands** are two low islands connected with the shore at the north-east point of the bay, and have reefs near them, the largest patch lying S.S.W. 6 cables from the westernmost island, with 8 and 10 fathoms close to.

**CAUTION.**—Vessels having no object in coming into Rocky bay should not close this part of the coast nearer than 6 miles.

**The COAST** from the Segyam islands trends about E.N.E. for  $13\frac{1}{4}$  miles to Sir James Brooke point, thence about N.E. by E. for  $12\frac{3}{4}$  miles to Nose point, which is low and wooded with a small hill at the back of it; the intermediate land is a low, densely wooded plain, well populated, with several cultivated spots, and overlooked by the high range of Mantaleengahan. The coast is slightly indented, and bold to approach to half a mile, the soundings, when that distance from it, being about 6 fathoms. Several streams of fresh water flow into the bays, and some of the points have projecting reefs; that off Nose point extending the farthest off, a distance of nearly half a mile. Three miles S.W. by W.  $\frac{1}{3}$  W. of Nose point is a reef awash half a mile from the shore.

**Tac-Bo-Lu-Bu**, in lat.  $8^{\circ} 43' 21''$  N., long.  $117^{\circ} 44' 26''$  E., and about  $7\frac{1}{2}$  miles E.N.E. of the Segyam islands, is a Malay settlement, and the district over which a Dato presides. It appears to be well populated. Goats, sweet potatoes, and fruit in small quantities may be obtained; and also water from a rivulet in fine weather, when there is no surf on the

beach. There is anchorage in the roadstead off the settlement in 12 to 16 fathoms, stiff mud, about a mile, or upwards, from the shore, with Mantaleengahan mountain bearing N.W. by N., and Addison peak, a remarkable thumb shoulder at the end of a spur, N. by E. Reefs project 3 cables off both the points forming the bay.

There is also another Malay establishment at Prahu point, about 8 miles to the north-east.

The soundings, when from 3 to 4 miles off the coast between Segyam islands and Nose point, vary from 20 to 30 fathoms, mud, deepening as the latter point is approached, with patches of 6 and 8 fathoms, coral, occasionally.

**East Island (Komay Komayan)**, the north-west extreme of which is in lat.  $8^{\circ} 53\frac{3}{4}'$  N., long.  $118^{\circ} 13' 56''$  E., is a low coral island nearly half a mile in extent, covered with trees, visible about 20 miles off, and has a reef extending from the eastern side, on the extremity of which is a small bush half a mile from the island. There is no anchorage near it, the depths in the immediate vicinity being upwards of 100 fathoms.

**The COAST** from Nose point trends N.N.E.  $\frac{3}{4}$  E. about 11 miles to Crawford cove, which is a mile deep, and has 5 fathoms at the entrance. Davie hill overlooks the shore at nearly 2 miles to the southward, and on the north side of the cove is a tree hill, the southern extremity of a coast range.

Immediately to the northward of Crawford cove are several low coral islands fronting the shore, giving rise to the name of Island bay to this part of the coast.

**ISLAND BAY** has been only partially sounded; but sufficiently so, however, to ascertain that several shoal patches exist, and that, close in, it is hazardous for vessels to navigate. It corresponds with Tay-bay-u on the opposite side of the island, the distance across being about 9 miles.

The plain intervening is cultivated in many parts, and broken up into several detached hills of conical form, at the back of which the up saddle hill of Pu-lute, and Step cliff on the Ma-la-nut range, are conspicuous.

Relief point, in the north-east part of the bay, is in lat.  $9^{\circ} 9' 45''$  N., long.  $118^{\circ} 12' 1''$  E., and from it coral ground, on which there are patches of 3 feet and 12 feet, extends  $1\frac{1}{4}$  miles to the south-west.

**Water.**—There is a fresh-water rivulet at half a mile to the north-west or within Relief point.

**Gardiner, Bessie, and Reef**, three low islands, upwards of a mile from each other, lie in a north-east direction from Crawford cove more than a third of the distance across Island bay. Reef island, the north-

easternmost, has its eastern side surrounded by coral, which dries half a mile from it, and has 14 fathoms very near the edge.

Another group of islands and sand-banks lies in-shore and to the northward of these, fronting the bottom of the bay ; the depth of water between and around them is 6 and 7 fathoms.

On the north-east island of the in-shore group is the ruin of a Mahomedan temple.

**Two and a Half Fathoms Patch** lies nearly midway between Reef island and Relief point, and 3 miles off shore, with the north extreme of Reef island a little open of Coast hill, which rises close to the shore at  $1\frac{1}{3}$  miles north of Crawford cove, bearing W. by S.  $\frac{3}{4}$  S. ; Step cliff, on Ma-la-nut range, W. by N.  $\frac{2}{3}$  N. ; and the Button, a bush islet near the shore, N.  $\frac{2}{3}$  W.

**The COAST** from Relief point trends 6 miles in an easterly direction to Bivouac point, where a good stream of fresh water breaks through the shingle. There is a rock awash nearly midway between the two points, at half a mile from the shore.

In front of this part of the coast, at  $3\frac{1}{4}$  miles from the shore, is a 3 fathoms coral patch, with depths of 15 and 16 fathoms, mud, inside it and which lies with Bivouac point N.E.  $\frac{1}{2}$  N.  $4\frac{1}{4}$  miles ; Relief point, N.W.  $\frac{2}{3}$  W.  $4\frac{1}{2}$  miles ; Table shoulder, the southern termination of the Victoria range on this side of the island, immediately overlooking the coast N. by W.  $\frac{2}{3}$  W. ; and the north extreme of Relief island, nearly in line with Coast hill, W. by S.

The soundings off Island bay, and between it and East island, vary from 20 to 40, and upwards of 100 fathoms, with rocky patches here and there of 6, 7, and 12 fathoms.

**Flat Island**, lying  $6\frac{1}{2}$  miles E.N.E. of Bivouac point, is 12 miles in extent, north and south, low, and covered with trees. It is separated from a sandy tongue projecting from Casuarina point on the main, by a channel 4 cables wide, in which there are 8 fathoms. On its north-east face a coral spit runs off nearly half a mile.

Together with the main land, a small bay is formed on the western side of the island, where good shelter from north-east winds may be found in 5 and 6 fathoms, mud, with Crawford point, the south-west extremity of Flat island, bearing S.E., and Emmeline island, the southernmost of some small islands just detached from the opposite shore, S.W. by W.

Emmeline island is bold to approach, but off Crawford point the reef, which fronts the south and western shores of Flat island, extends 4 cables, and has 8 and 9 fathoms close to the edge.

A reef commencing at the sandy tongue, projects 6 cables to the southward of Casuarina point, close to which there are 8 fathoms.

Casuarina point is in lat  $9^{\circ} 15' N.$ , long.  $118^{\circ} 24' 16'' E.$

**CAUTION** is necessary in going into this bay, as it has been only partially sounded. No watering-place was found in it.

**Tides.**—It is high water in this vicinity, full and change, at midnight and on the day following at 9h. 30m. a.m. Rise of tide  $6\frac{3}{4}$  feet.

**Sand Island** lies E.  $\frac{1}{2}$  N. 5 miles from Casuarina point, and  $3\frac{1}{4}$  miles from the nearest part of Flat island. It is one-quarter of a mile in extent, covered with wood and surrounded by a reef, dry at low water, which, on the eastern side, extends half a mile from the island, with from 6 to 12 fathoms close to the edge.

The soundings outside Flat, and Sand islands vary from 20 to 40 fathoms, mud; in their immediate vicinity the depths are 10 and 12 fathoms, mud, decreasing gradually to the shore. Shoaler casts, such as 6 and 7 fathoms of sand and coral, here and there, may always be anticipated.

At  $1\frac{1}{2}$  miles S.W.  $\frac{3}{4}$  W., from the centre of Sand island, is a  $5\frac{1}{2}$  fathoms patch of coral, with 14 fathoms, mud, on either side.

**30th of June Island**, lying N.E. by N.  $8\frac{3}{4}$  miles from Sand island, and  $2\frac{1}{2}$  miles off shore, is similar in all respects to Sand island, the reef on the east side extending only 4 cables.

**Maltby Island**, nearly as large, and of the same description as Flat island, lies 4 miles to the N.N.E. of the 30th of June island, being separated from the shore by a channel one mile wide, but which has not been sounded.

Two dry sand-banks with reefs lie between these islands, the depth of water in the vicinity being from 4 to 7 fathoms, and there is a reef awash N.W. three-quarters of a mile from 30th of June island.

A rocky spit also extends 4 cables from the south-west point of Maltby island.

**The COAST** opposite these islands partakes of the same features as that farther to the southward, being low and thickly wooded. Victoria peak, 5,680 feet above the sea (page 180), overlooks it, and the mountain range, which presents some deep gorges and picturesque valleys, is fronted by an extensive and densely wooded plain, the hills not approaching the sea until near Table head, which is low, and nearly 12 miles N.E. by N. of Maltby island. On the north side of Table head is a small inlet for boats.

**Village Bay**, in which are a few huts, 2 miles to the northward of Maltby island, is small, and a coral patch, 6 cables in extent, north-west and south-east, occupies its centre. Off the south point of the bay are two islets connected with the shore by a reef, and a reef fronts the coast for a mile from the point on the north side.



**Water.**—There is a good fresh water stream 5 miles to the south-westward of Table head, and 2 miles to the southward of S.W. hill, near where the range forms part of the coast line.

**The SOUNDINGS** off this part of the coast are exceedingly irregular.

East, 6 miles from 30th of June island, there is a bank of sand and coral upwards of 5 miles in extent, on which the least water that has been discovered is  $6\frac{1}{2}$  fathoms; immediately outside there are no soundings with 80 fathoms; the depths inside the bank vary from 12 to 20 fathoms.

**Three and a Half Fathoms Patch.**—Rocky ground also extends in a northerly direction from this bank, where, at the extremity, is as little as  $3\frac{1}{2}$  fathoms, perhaps less. This patch lies east of Village bay about  $2\frac{1}{4}$  miles from the shore, and from it the south-eastern extreme of Maltby island bears S.W.  $\frac{1}{2}$  S.; the huts in Village bay, W.  $\frac{3}{4}$  N.; Dome, a conspicuous hill on the ridge which connects Table head with the Victoria range, N.W. by W.  $\frac{1}{4}$  W., and Table head, N. by E.  $\frac{3}{4}$  E.

At  $1\frac{1}{2}$  miles to the eastward of this patch there is no bottom with 120 fathoms, but at 4 miles to the north-eastward of it there are 105 fathoms water,  $2\frac{1}{2}$  miles from the shore, with 30 fathoms immediately inside. The bottom is distinctly visible when on these banks.

**PORT ROYALIST** has its entrance  $4\frac{1}{2}$  miles north-eastward of Table head; and Tide-pole point, the inner extreme point of low land on the north side, is in lat.  $9^{\circ} 43' 43''$  N., long.  $118^{\circ} 43' 3''$  E. It is formed in an extensive densely wooded plain, fronting a high mountain ridge to the south-west of mount Peel, of which mount Beaufort and Thumb peak (page 195) are conspicuous. The latter, when seen from the south-east, appears a remarkable steep conical mountain, with a knob on the summit, and it bears N.W. by W.  $\frac{1}{2}$  W. from the entrance of the harbour. The entrance is a strait nearly 3 miles long and 2 miles wide, in a W.N.W. direction, being almost at right angles to the prevailing winds in both monsoons.\*

Coral spits project from both the outer points, which contract the channel at the entrance to one mile in width. The south spit extends 7 cables from the shore; while the north projects only 4 cable, and parts of both dry at low water.

The reefs forming these spits extend along the coast outside and have 12 and 13 fathoms close to the edge; that on the north has several dry patches.

In the strait the depth is 25 fathoms, mud, which decreases as the head of the harbour is approached to 4 and 5 fathoms close to the reef.

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\* See Admiralty plan of port Royalist, No. 2,914; scale,  $m = 1.85$  inches.

There are two inlets on the south side of the strait ; the eastern has a rock at the entrance lying off a red cliff, which when first seen may be easily mistaken for some native huts. The western and largest is upwards of  $1\frac{1}{2}$  miles deep, and has a coral spit projecting nearly 4 cables from Heron point, its north entrance point.

There is deep water in both these inlets, but their entrances are very much contracted by coral. .

From the inner part of the strait the harbour extends 3 miles in a northerly direction and is 2 miles wide. The north and western shores are chiefly mangrove, the former having several bays and inlets, all of which are shoal and fronted with coral.

**E-wi-g River** disembogues on the western side of the harbour, to the northward of apparently a deep mangrove bay, and has a small island at the entrance, W. by N. 2 miles from Tide-pole point.

This river is navigable for boats about  $2\frac{3}{4}$  miles ; half a mile farther up is a small village, which in 1850 contained 40 or 50 persons, chiefly Bysayans, carrying on a small traffic, beeswax, rice, maize, &c. with some of the contiguous settlements. They were quite harmless and willing to afford supplies, but unable to do so, being in a wretched state of poverty and filth.

After heavy rains the river is fresh almost at the entrance ; but in the dry season boats must go some distance up to get the water good.

Mud dries at low water nearly three-quarters of a mile from the entrance, through which are two boat channels diverging from either side of the island, at the mouth of the river.

**Harbour Island** lies off the largest opening on the north shore of the harbour ; and besides being connected with the shore by reefs, has a rocky spit, and some detached coral patches extending nearly a mile from it in a southerly direction, having upon its extremity a rock nearly awash with 6 fathoms close to.

**Anchorage.**—Between the end of this spit and Buckle point three-quarters of a mile N.N.W. of Tide-pole point, a distance of two-thirds of a mile, is the best place to anchor during the north-east monsoon. In the other season, vessels may lie farther to the southward.

Vessels bound to port Royalist, and wishing to remain at anchor outside for the night, will find the most convenient place somewhere abreast of Bryson point, 3 or 4 miles to the northward of the entrance, in 10 or 15 fathoms water, about 2 miles off shore.

**Directions.**—The soundings off port Royalist are deep, there being no bottom with upwards of 500 fathoms of line ; and it is not until a vessel approaches within a mile of a line joining the points at the entrance that soundings will be obtained when from 120 fathoms the depths suddenly

decrease to 20 or 30 fathoms, sand. This change is sometimes marked by a ripple line on the surface.

The only part of the harbour that is bold to approach is the shore on the northern side of the strait, from about half a mile inside the point to Buckle point. There is, however, a spit between the latter and Tide-pole point, extending 2 cables off, the edge of which is generally well defined by the light green water over it.

In proceeding into port Royalist do not approach either shore near the entrance within a mile, until abreast of the opening.

When Tide-pole point is seen mid-way between Thumb peak and mount Beaufort, bearing about N.W. by W., the vessel will be in the fair-way, and may then be steered direct for it.

Tide-pole point in line with Thumb peak, N.W. by W.  $\frac{3}{4}$  W. leads just clear of the North spit, and the same point in line with mount Beaufort, bearing N.W.  $\frac{1}{4}$  W., clears the South spit.

Having passed the spits, keep the northern side of the strait on board; and when abreast Tide-pole point, in 17 or 20 fathoms, steer gradually to the northward for Buckle point, keeping upwards of 3 cables from the shore, and anchor in from 9 to 12 fathoms, mud, about this distance W.N.W. of the latter point.

It is recommended not to go beyond half a mile to the northward of Buckle point, as the channel between the reefs becomes narrow, and a  $1\frac{1}{2}$ -fathoms patch lies 6 cables N. by E.  $\frac{1}{3}$  E. of it.

Vessels working in or out of port Royalist should not approach either the south side of the strait or harbour nearer than half a mile.

During easterly winds a heavy swell sets into the strait, which breaks violently on the reefs, and also across the bay to the southward of the river.

**DEEP BAY.**—From port Royalist the coast trends a little to the westward of North for 12 miles, and then E.N.E. for 25 miles, to Bold point, the angle of the bight forming what the old navigators named Deep bay.

This bay corresponds with Ulugan bay on the opposite side of the island, the plain intervening, on either side of which mount Peel and the Cone are conspicuous, being only 5 miles across; and in approaching Deep bay from the westward, mounts Herschel and Airy appear as two islands between mount Peel and the range to the southward.

Four low coral islands, covered with wood, lie in a direct line N.E. by E.  $\frac{1}{3}$  E. and S.W. by W.  $\frac{1}{3}$  W. nearly equidistant across the bottom of this bay, and between these and the shore is another group, consisting of four islands and some reefs and dry sand patches, all of which have been but imperfectly delineated and sounded.

Castle point, on the north shore of Deep bay, in lat.  $9^{\circ} 59' N.$ , long.  $118^{\circ} 55' 51'' E.$ , probably so named from a small rocky protuberance (a characteristic feature of the Cleopatra range) on the brow of the hill over it, is the commencement of a bold range which borders the coast to Green Island bay. At  $2\frac{1}{2}$  miles westward of Castle point is a small river, navigable for boats, and there is also a stream of fresh water three-quarters of a mile eastward of the point.

At 14 miles E.N.E. from Castle point, is Bold point, with a double hill immediately over it, forming the north-east extremity of Deep bay, and is, as regards both the aspect of the land and depth of water near it, quite what the name imports.

**Ramesamey and Mackesy Islands.** — Ramesamey, the south-westernmost of the four low coral islands, mentioned above, lies in a bend on the western side of Deep bay, a mile from the shore, and  $8\frac{1}{2}$  miles to the northward of port Royalist. It is surrounded by a reef extending off one-quarter of a mile, and there is a small Tuft island S.E. by S. three-quarters of a mile from it.

Mackesy island, situated E.N.E.,  $3\frac{1}{2}$  miles from Ramesamey island, is of similar form, three-quarters of a mile in circumference, and appears to have no reef round it.

**Meara and Fraser Islands**, both apparently bold to approach, lie inshore of the above, fronting the opening in the mangrove, on the west of which, near the coast, is a hill range of reddish aspect.

A reef partly dry at low-water, lies half a mile to the south-east of the north point of the inlet, and a bush islet close to the shore, a mile to the northward of it.

There are depths of 3 and 4 fathoms inside Ramesamey and Meara islands, and 10 fathoms near the entrance of the Mangrove inlet.

**Reef Island**, lying 4 miles to the E.N.E. of Anchorage island, is, including the reef that surrounds it, upwards of a mile in extent N.N.E. and S.S.W., and the same distance N.W. and S.E., and there is a small sand-bank, dry at low water, at 3 cables from its south-west extreme.

**A Rocky Bank**, nearly dry at low water,  $1\frac{1}{4}$  miles in a north-east and south-west direction, lies half-way between the two latter islands, to the northward of which, and between Reef island and the shore, a distance of  $3\frac{1}{2}$  miles, are two of the four islands, composing the inner group, with a dry sand-patch off the outer extremity of each. The depth of water between the rocky bank and Reef island is 11 and 12 fathoms.

**Anchorage Island**,  $2\frac{1}{4}$  miles in circumference, the north-easternmost and largest of the group, has a reef fronting the eastern side, which at low water dries off 3 cables, and a rock awash at nearly three-quarters of a mile from the north-west point. The channel inside this island is

almost blocked up by two reefs, with dry sand-patches on each, and a shoal spit which extends half a mile from Castle point.

Between the latter and Anchorage island there are depths of 12 and 17 fathoms.

**Soundings.**—There is a bank off Deep bay, with 5 fathoms on it, upwards of 2 miles in extent, lying nearly in a direct line between port Royalist and Bold point, and S.S.E.  $6\frac{1}{2}$  miles from the body of Anchorage island.

Fronting the group of islands, a little to the southward, the soundings vary from 8 to 12 and 23 fathoms.

A bank with 17 and 27 fathoms over it lies  $5\frac{1}{2}$  miles south-east of Bold point; but beyond this, and also within 2 miles of the coast to the westward of the point, there are no soundings with upwards of 170 fathoms; nor are soundings obtained at this depth (unless within 3 cables of the shore, where there are 30 fathoms) all along the coast, until 3 miles south-east of Anchorage island, when it changes suddenly to 6, 9, and then 20 fathoms.

**Pasig shoal** with 5 fathoms water lies E.  $\frac{3}{4}$  S. 35 miles from Anchorage island.

**Charybdis bank** with 4 fathoms water lies E.  $\frac{1}{4}$  N. 34 miles from Anchorage island, and N.  $\frac{1}{4}$  W.  $7\frac{1}{2}$  miles from Pasig shoal. Between Charybdis bank and Pasig shoal there are depths of 25 and 27 fathoms.

**Constancia shoal**, with  $3\frac{1}{2}$  fathoms water lies E.  $\frac{3}{4}$  N. 30 miles from Anchorage island, and W. by N.  $\frac{3}{4}$  N. 4 miles from Charybdis bank. About 10 miles W. by S. from Constancia shoal, there is a coral bank with 17 fathoms water, having in the channel between 190 fathoms no bottom.

**Green islands.**—From Bold point the hills forming the coast range lie in a northerly direction; and at 3 miles to the northward of the double hill over the point, on the same range, is Bold peak, upwards of 3,000 feet above the sea.

The sweep of the current, either round this point or from Green Island bay, appears to have detached a portion of the low land, which now forms North and South Green islands, together nearly 4 miles in length, and two smaller islands to the northward, fronting the east side of Bold peak.

**Pascoe channel**, the channel inside Green islands, through which the current in the month of June was observed running at the rate  $3\frac{1}{2}$  knots an hour to the northward, is from one to 3 cables wide. Reefs lie either side of this channel. Off a point on the mainland to the southward of the entrance, the coral extends 4 cables, and there is a rock awash with 7 and 8 fathoms close to, immediately in the opening to the northward.

The depth of water about a mile outside North Green island is 27 and

28 fathoms, but there is a 2-fathoms patch E. by S. this distance from its north extreme.

**GREEN ISLAND BAY**, to the north-east of the Green islands, has several low coral islands, with extensive reefs and numerous sand-patches in it.

At Cliff point, 11 miles N.N.E. of North Green island, a ridge of low hills, named the Barbacan range, joins the coast, and behind these is a higher range in the body of the island, with some double summits and long table spurs or shoulders. Further to the south-west the Four peaks on Cleopatra range show over the comparatively low conical shaped hills which terminate the Bold peak chain.

**Barbacan**.—A small river disembogues at  $5\frac{1}{2}$  miles north-eastward of Cliff point, and it is shoal off the entrance, where the surf breaks heavily at times. On the right bank, at half a mile up, is the small village of Barbacan, which in 1850 contained a population of 100, chiefly Bysayans, in the jurisdiction of the Spanish settlement of Dumarán, and it is protected by a stockade built on the summit of a small green hill immediately overlooking it. At the back of the village is a plain bounded by the low hills above noticed.

From Barbacan the northern shore of Green Island bay trends about E. by N. for  $10\frac{1}{2}$  miles to High point, a bold headland forming the north-eastern limit of the bay. At 2 miles from the river is Barbacan point, and close to the sea, at 5 miles beyond, is a conical shaped hill named Bay peak, rising to a height of 1,800 feet.

**Mount Baring**, in lat.  $10^{\circ} 24' 55''$  N., long.  $119^{\circ} 32' 56''$  E., and N.E. 33 miles from Bold point, rises directly over High point to an elevation of 2,100 feet. It is separated from Bay peak by a steep valley, and from a dome-shaped hill to the northward by a deep saddle, and when viewed in a north-east or south-west direction, it shows a small table spur sloping from the summit.

**Johnson Island**, the outer of the south-west portion of the group in Green Island bay, lies N.E. 19 miles from Bold point, and  $4\frac{1}{4}$  miles from the shore. It is nearly a third of a mile across, and partly surrounded by a reef, which on the western side projects 4 cables.

A bank, consisting of sand and coral,  $1\frac{1}{2}$  miles in extent, east and west, dries at low water  $2\frac{1}{4}$  miles S.  $\frac{1}{2}$  W. of the island, close to the southern or outer edge of which are 12 and 14 fathoms. There is also some rocky ground with 4 fathoms, and 18 and 20 fathoms, mud, close to, with the island bearing N. by W.  $\frac{3}{4}$  W. distant  $3\frac{1}{2}$  miles.

**Howley, Stanlake, Flat, and Shell Islands** lie inshore of Johnson island; Howley, the south-western and innermost, is N.N.E.  $7\frac{1}{4}$  miles from North Green island, and  $1\frac{1}{4}$  miles from the shore, with a

reef between; and there is a sand-bank S. by W.  $\frac{1}{4}$  W.  $1\frac{1}{2}$  miles from Howley island. Stanlake and Flat islands are the two largest in the bay, and there is a depth of 9 fathoms between them, decreasing gradually to 3 fathoms close off Cliff point opposite the latter island.

A sand-patch lies  $1\frac{1}{2}$  miles to the eastward of Stanlake, and there is an islet between Johnson and Flat islands. Shell island is N.  $\frac{1}{2}$  E. 3 miles from Johnson island, between it and Barbacan. It has a shoal extending one-third of a mile from its north-western side, and a sand-patch at 6 cables to the south-westward.

**Green Island**, the outermost of the north-east portion of the group, lies E.  $\frac{3}{4}$  N.  $6\frac{1}{4}$  miles from Johnson island, and S.W. by S. from High point. It stands on the western side of a quadrangular-shaped reef  $1\frac{1}{4}$  miles in length E.N.E. and W.S.W., and nearly one mile in breadth, at the eastern corners of which are some rocks awash, and a dry sand-bank with 12 fathoms close to.

**Reef Island**, from the east side of which coral projects three-quarters of a mile, lies W.N.W.  $2\frac{1}{4}$  miles from Green island, and N.W. by W.  $\frac{1}{2}$  W.  $4\frac{1}{4}$  miles from Johnson Island; midway between it and Shell island is a sand-bank and reef.

The soundings between these islands and reefs are 10 and 14 fathoms, mud, and they appear to decrease gradually to the shore.

**Hog Island**, lying 3 miles N. by W.  $\frac{1}{4}$  W. of Green island, and the same distance from the shore, is 300 yards in extent, with a reef projecting 4 cables from the eastern side, and a rock awash, East, northerly, one mile from it.

**The SOUNDINGS**, from 4 to 6 miles in front of the group in Green Island bay, average about 25 fathoms, sand and mud. Sometimes red coral is brought up with the lead. At  $2\frac{3}{4}$  miles N.E. by E.  $\frac{1}{4}$  E. from Green island, is a 5-fathoms patch, with 16 and 17 fathoms on either side; there is also a coral bank (upon which  $4\frac{1}{2}$  fathoms is the least water found) on the same bearing, but 7 miles from Green Island, with mount Baring N.N.W.  $\frac{3}{4}$  W. and distant from High point (the nearest shore)  $3\frac{1}{4}$  miles. Farther to the south-east are two other banks, which probably may have less water on them than that given in the chart, viz., 8 fathoms.

**The COAST** beyond High point trends in a north-east direction for 12 miles to Endeavour point, which is low and densely wooded. Midway between is Squall point, from which a range extends nearly North to the coast at the same distance on the other side of Endeavour point, having Drake peak, a sharp hill 1,300 feet above the sea, on the southern part, and a double peak 1,400 feet high to the northward of it.

**Illan**.—Two miles to the northward of High point, where the low land joins the foot of mount Baring, is a small river, with a village similar to

that of Barbacan, named Illan, on the right bank, half a mile from the entrance. The river is fresh at the village. A coral spit extends nearly three-quarters of a mile from the south point at the entrance.

**Dry Sand Banks.**—Two reefs lie off this part of the coast. The outer, which is a mile in diameter, and has a dry sand-bank in the centre is  $4\frac{1}{2}$  miles from the shore, and E.  $\frac{2}{3}$  N.  $6\frac{3}{4}$  miles from High point. The other is  $2\frac{3}{4}$  miles in-shore of it, and has also a sand-patch, which, as well as that on the outermost reef, shows at all times. Reefs and sand-banks extend nearly 2 miles off the coast to the northward of this.

**DUMARAN ISLAND**, separated from Endeavour point by Cook channel (page 239) is about 42 miles in circumference, and not more than 600 feet above the sea in any part. It is of irregular form, and has no very remarkable features by which to distinguish it, the hills being apparently nearly of the same elevation, and, with the exception of a few in the neighbourhood of the settlement on the north shore, and near the north part of the island, are thickly wooded.

There is an inlet on the south-east side of the island 3 miles long with 5 fathoms water near the head; and at the eastern extremity of Dumaran is an island connected with the shore by a sandy isthmus east of which, nearly 6 miles, is a small wedge-shaped island named Trepang.

Three small islands front this part of the coast; Christmas, the south-west and largest island, lying 4 miles east of the opening of the inlet above mentioned. At about  $1\frac{1}{2}$  miles S.W. from the summit of Christmas island is a 3-fathoms patch of coral, and there is also one with 4 fathoms at 8 cables N.W. of the same.

Between these islands and the shore, and also off the entrance of the inlet, the depth of water is 10 and 12 fathoms; but at  $4\frac{1}{2}$  miles south-west of Christmas island, abreast of Green point, the south point of the inlet, is a rocky bank with only 4 fathoms on it. Also south-west of Green point, fronting an opening, is a  $2\frac{1}{2}$  fathoms patch, lying  $1\frac{1}{4}$  miles from the shore, from which South hill, on the southernmost part of Dumaran island, bears E.  $\frac{1}{2}$  S.

Barton point, the south-west extremity of Dumaran, has a spit with  $2\frac{1}{2}$  fathoms water on it, projecting  $1\frac{1}{4}$  miles to the westward.

**Coral Shoal.**—Nearly midway between Barton point and the inner Dry Sandbank already noticed as lying off the coast between High and Endeavour points, is a coral shoal with only 3 fathoms, and perhaps less, over it. From it South hill, Dumaran, bears E.  $\frac{3}{4}$  N.; Endeavour point, N.  $\frac{1}{4}$  W.; and Drake peak, N.W. by W. The soundings in the immediate vicinity of this shoal are 12 and 15 fathoms.

**DUMARAN.**—The Spanish settlement of Dumaran, next in importance to that of Tai-Tai, is  $4\frac{1}{2}$  miles to the northward of Barton point, and



in the bottom of a small bay immediately opposite Endeavour point. The fort stands on a hillock close to the landing place in lat.  $10^{\circ} 32''$  N., long.  $119^{\circ} 45' 51''$  E., and in 1850 was in a dilapidated condition, the terre plain, on which a few pieces of old iron ordnance were mounted, being partly constructed of nebong, supported by poles, about 25 feet from the base of the building. A church forms part of the interior arrangements of the fort. The village is prettily situated in the rear amongst some cocon-nut trees, and there is a considerable tract of land in the interior under cultivation.

**Supplies.**—Rice, maize, sweet potatoes, tobacco, and cotton, are grown, both for the consumption of the inhabitants and for the purposes of traffic. Pigs, goats, and fowls are also plentiful, but an extravagant value is put on them. There is not any eligible watering-place in the bay.

**Anchorage.**—Shelter from north-east winds will be found on the west side of Dumarán in from 9 to 12 fathoms, mud, S.S.W. of the bay where the settlement is; recollecting, however, that a reef extends  $1\frac{1}{2}$  miles in a southerly direction from the west point of it, and also that the western shore of the island from Barton point is fringed with coral, which at low water dries from 4 to 5 cables off. To avoid the end of the former danger, do not bring Drake peak to bear to the southward of W.  $\frac{1}{4}$  N.

Small vessels may anchor in 4 or 5 fathoms east of the spit, about a mile from the fort; but the bay is much contracted by reefs, and exposed to southerly winds.

The soundings to the south-east of Dumarán extend 9 miles from the island, when, at that distance, they are from 40 to 50 fathoms; beyond this there is no bottom with upwards of 60 fathoms.

**COOK CHANNEL**, between Dumarán island and the shore of Palawan, is  $1\frac{1}{2}$  miles wide, and has its southern entrance between Endeavour point and a rocky spit with a sand-bank on it, dry at low water, extending to the southward  $1\frac{1}{3}$  miles from the west point of Dumarán. To the northward of this the channel lies between several small islands, which contract it to three-quarters of a mile wide in the narrowest part. Its northern entrance opens into a bay which has been but partially sounded and which doubtless contains numerous other shoals than those already discovered.

The tides set rapidly through the channel, and it should not be attempted by a sailing vessel, unless under peculiarly favourable circumstances.

The soundings in the south entrance of Cook channel are from 12 to 15 fathoms, mud; amongst the islands they average 10 fathoms, increasing to 14 and 20 fathoms to the northward.

From Endeavour point the island of Palawan trends in a N.N.W. direction, and the coast assumes an entirely different character, being

fronted by numerous islands and rocks, not one of which partakes of the features of those farther to the southward.

Dampier point bears N. by W.  $\frac{3}{4}$  W., distant 9 miles from Endeavour point, and forms the western extremity of the bay mentioned above. Point peak, a sharp peak 960 feet above the sea, and others of less elevation, immediately over it, joining the range noticed on page 237.

The north-west and north faces of Dumarán island have reefs lying off upwards of 3 miles from the shore in some places, with deep water inside. The north extremity of the island terminates in a long head, with a precipitous white cliff point, and some rocks awash just to the eastward of it. At  $2\frac{1}{2}$  miles north of this cliff point is Monk and Friar island, with a barren rock about 60 feet high one mile W. by S.  $\frac{1}{2}$  S. of it.

**South Channel Island.**—Of the islands in the northern entrance of Cook channel, the three largest lie on the eastern or Dumarán shore, in a N. by E. and S. by W. direction. South channel island is 2 cables west of the southernmost of these three, and is connected with it by a reef awash in some parts at low water.

**A Rock Awash** lies apparently in the centre of Cook channel at 3 cables from the edge of the reef on the south-east side of South Channel island, with the summit of the large island N.N.W. three-quarters of a mile, and Endeavour point W.S.W. the same distance.

A spit extends a quarter of a mile from the west side of the central island.

**Goat Island**, the northernmost on the eastern side of Cook channel, lies N.N.E.  $2\frac{1}{2}$  miles from South Channel island; it is 380 feet in height above the sea, and has a rocky head just detached from the north extremity.

A 3-fathoms coral patch lies W.  $\frac{3}{4}$  N. one mile from the summit of this island with 15 and 16 fathoms close to. At  $1\frac{1}{4}$  miles N.N.E. of the above rocky head of Goat island is the commencement of a chain of reefs extending 3 miles in the direction of the White cliff on the northernmost point of Dumarán.

**Reef and Bivouac Islets.**—On the west side of Cook channel are four small and one larger island. The latter, 200 feet above the sea, lies nearly west about 2 miles from the centre island on the opposite side, and fronting it are Reef and Bivouac islets. The former of these is surrounded by coral, which, in a southerly direction, extends 4 cables from it, contracting this part of the channel to three-quarters of a mile wide. Bivouac islet, 160 feet high, lies half a mile to the N.N.E. of Reef islet, is bold to approach, and has a small rocky head on the north-east side, with 4 fathoms close to it.

**North Channel Island** lies about half a mile north-west of Bivouac islet, and from it a reef projects 2 cables in a north-east direction ; there is a small dry sand-patch on the south-west side.

**Directions.**—To steam through Cook channel coming from the southward, do not bring Endeavour point to bear to the eastward of N.  $\frac{1}{2}$  E. until the vessel is about 6 miles from it ; then, after clearing the 3-fathoms coral patch, noticed on page 238, steer to pass the point closely, in order to avoid the rock awash mentioned in the preceding page. Proceed midway between South channel island and the shore, and, having rounded the former at a convenient distance, steer N.N.E.  $\frac{1}{4}$  E. for the left or west extreme of Goat island ; when Reef islet bears West, edge more to the northward, to give a berth to the spit which extends from the west side of the central island. Do not pass more than half a mile to the westward of Goat island, which will clear the 3-fathoms patch between it and North Channel island. Having passed Goat island, keep it a little to the eastward of South, until the summit of White cliff point, the northernmost point of Dumaran, bears East, to avoid the chain of reefs 3 miles long, lying between the island and the latter point, when, if not bound to Tai-Tai or any of the islands adjacent, proceed by passing to the westward of the Monk and Friar island.

**BARREN ISLAND**, lying to the north-east of Dampier point, and separated from it by a channel 2 miles wide, in which there are 23 fathoms, is a narrow island,  $2\frac{3}{4}$  miles long, north and south, and 720 feet in height. It is of a rocky barren aspect, with comparatively few trees growing upon it.

The soundings round the island are deep, 23 and 25 fathoms ; but for a short stay a vessel might anchor on a  $6\frac{1}{2}$  fathoms coral patch, either three-quarters of a mile off, or on one of the same depth  $2\frac{1}{2}$  miles off, and both east of a small bay on the east side three-quarters of a mile from the south point of the island, where there is a depth of 11 fathoms at a cable from the beach.

**Three-fathoms Patches.**—There is a 3-fathoms patch S.  $\frac{1}{4}$  E. 8 cables, and one with the same depth E. by S.  $1\frac{1}{4}$  miles from the south extreme of Barren island, the two being in line with Dampier point bearing S.W. by W.  $\frac{3}{4}$  W.

**Water.**—A stream in the above-mentioned bay, difficult to distinguish unless close to the beach, was the only eligible place discovered on this part of the coast for watering, which here is a tedious operation if not supplied with long hoses. In the absence of these the natives were found willing to fill the casks and float them off on bamboo rafts, constructed especially for the purpose, at the rate of 75 cents per tun. If the latter expedient be adopted, patience is indispensable. Vessels should be pre-

pared to quit the anchorage on the appearance of easterly winds, as the swell, which usually precedes them, comes in suddenly, and may frequently be anticipated on the change of moon.

**Tides.**—It is high water, full and change, at Barren island at 9 h. 30 m. ; springs rise  $5\frac{1}{4}$  feet.

**CARLANDAGAN ISLANDS**, lying E.N.E. distant 16 miles from the north-east extremity of Dumarán island, are composed of two large islands, and three smaller islets or rocks.

Carlandagan, the southernmost island, is 3 miles in extent from north to south, and has a high precipitous conical head, connected with the south part by a low narrow isthmus ; and a detached rocky head with an islet off, at its northern extremity.

**Maducang Island**, 926 feet high, lies N.  $\frac{1}{2}$  E. of Carlandagan, the channel between, in which there are  $10\frac{1}{2}$  fathoms, being 6 cables wide. The island is  $1\frac{1}{2}$  miles in extent, and has two precipitous rocky heads projecting in a north and north-west direction from its highest part, from which also a saddle shoulder slopes to the southward. A small island named Indong is connected with the shore on the south-east side, and to the eastward  $3\frac{3}{4}$  miles is Bird island, with a remarkable white rock  $2\frac{1}{2}$  miles N. by W. of it. There 25 to 30 fathoms water close to the group all round, and 50 and 60 fathoms, yellow mud, in the vicinity.

**Tides.**—It is high water, full and change, at the Carlandagan islands at 9 h. 30 m. ; springs rise 6 feet.

**The COAST.**—Immediately opposite Barren island, and on the north of Point peak, is an inlet  $3\frac{1}{2}$  miles deep, with two islands at the entrance, the largest of which, named Shadwell island, is  $1\frac{1}{2}$  miles from the shore.

There are also three other islets farther up, with 5 fathoms close to them, and a small village at the head of the inlet. Two reefs, one with a dry sand-bank on it, front the southern shore of the inlet, and rocks out of water lie off the points under the peak at the entrance.

**Three-fathoms Patch.**—A rocky patch, with 3 fathoms water on it, lies S.E.  $\frac{1}{4}$  S. one mile from the summit of Shadwell island. The soundings in the neighbourhood are 16 fathoms, but between it and Barren island they are 20 and 23 fathoms.

**SOUTH-TAI-TAI ISLAND** bears N.W. by N. distant 6 miles from the north extreme of Barren island, and is separated from the south point of the bay of Tai-Tai, by a channel barely a mile wide, with 19 fathoms in it. The highest part of the island is elevated 610 feet above the sea. A rock awash lies rather more three-quarters of a mile from the shore on the east side ; and at the south-east extremity of the island is a small spit, with an islet and a white rock near it.

Midway between this island and the north extreme of Barren island is a bank nearly a mile in length, E. by S. and W. by N., with 3 and 4 fathoms, coral, upon it; the former depth is at the western edge, N. by W.  $\frac{3}{4}$  W.  $1\frac{1}{4}$  miles from Starfield, a small island in the middle of the channel, 2 miles to the north-east of Shadwell island.

From the point opposite South Tai-Tai island a reef fronts the coast, which, when off an inlet  $2\frac{1}{2}$  miles south of it, extends  $1\frac{1}{2}$  miles from the shore, with 19 fathoms near the edge.

**TAI-TAI BAY**, nearly 10 miles wide and 6 miles deep, affords good shelter in the south-west monsoon. Its western shore corresponds with the eastern side of Malampaya inner sound, the distance across in some parts not exceeding 4 miles.

A high range overlooks both shores, and that portion which separates the north-west part of Tai-Tai bay and bottom of Bacuit bay has an abrupt shoulder 1,680 feet above the sea, and some remarkable sharp hunch peaks on it, giving rise to the appellation of Shark-fin range. Four islands lie across the entrance of Tai-Tai bay, extending in a northerly direction from South Tai-Tai island. Elephant, Castle, and Iguano, the three northern islands, as well as Old Castle point, the north-eastern limit of the bay, and a remarkable overhanging rock named Lion rock, lying nearly a mile S.S.E. of it, being high precipitous rocks, of limestone formation, partially clothed with foliage, precisely similar in character to those composing the rugged group of Bacuit bay, on the west side of the island.

Tai-Tai bay has been only partially sounded. The western shore is fronted by coral, which in some places extends 2 miles off, with 10 and 17 fathoms close to the edge.

Tai-Tai fort, lat.  $10^{\circ} 50' N.$ , long.  $119^{\circ} 30' 56'' E.$ , in the south-west angle of the bay, is the principle settlement of the Spaniards on the island of Palawan. From their own account, they first planted themselves here in 1600, by erecting a stockade on the right bank of what is now a diminutive mangrove creek. This, however, in a few years was abandoned; and the permanent fortress, which now stands on the extremity of a narrow isthmus (nearly isolated at high water), on the eastern side of the small bay where the village is, was commenced in the year 1710, and, as recorded in the interior of the building, finished in 1738.

The fort, which had been allowed to fall into a dilapidated state, was, under the energetic Alcalde, Antonio Gimenez, an officer in the Spanish Royal Engineers, put in an efficient condition. The walls are 30 feet high, and surmounted by a narrow parapet, in the embrasures of which are several pieces of brass and iron ordnance, of small calibre. The garrison, in 1850, consisted of about 200 soldiers, Manila men, and there were seventeen gun-boats attached to the station.

The population at the same period was said to be about 600, consisting of Bysayans and half caste Manila people, over whom are placed the Alcalde, or governor of the province, and seven European Spanish officers, including a padre. Extensive tracts of land in the interior are under cultivation ; and a good foot-path, or bridle-road, communicates with Malampaya inner sound, on the opposite side of the island, as noticed on page 215.

**Supplies.**—The usual supplies, such as pigs, goats, fowls, vegetables, &c., are to be obtained in moderate quantities, and there were some cattle seen in the interior.

Water, here as elsewhere on this coast, is not plentiful, that is, such as can with facility be procured by ships' boats.

The mud and rocks dry some distance off the fort at low water ; and there are several detached coral patches lying upwards of a mile from the shore, with 9 and 12 fathoms close to them.

From Tai-Tai the shore of the bay trends in a northerly direction. At 2 miles is Tai-Tai head, and  $3\frac{1}{4}$  miles beyond is a bush island, just detached from the shore, with a boat channel inside. A reef awash lies  $1\frac{3}{4}$  miles off a little to the southward of this.

**Polarican.**—There is an islet on the north side of a small opening in the reef, 8 miles to the northward of Tai-Tai, which leads to a rivulet of fresh water, and where, on a hill overlooking it, is a stockade and a small settlement, named Polarican, prettily situated amongst some cocoa-nut trees.

In the north-west part of the bay,  $3\frac{1}{4}$  miles from Polarican, there are some openings in the mangrove whence the shore in irregular outline trends to the eastward to Old Castle point, a deep indentation between forming Silanga bay.

**Silanga Bay,** which is 2 miles wide and nearly the same deep, has a settlement comprising a stockade and a few houses built upon a small isthmus head in the north-western shore and immediately under Silanga peak, 1,700 feet above the sea.

To the northward of this is a boat passage leading into the bottom of Shark-fin bay, a distance of about 2 miles, which at high water converts the Castle point peninsula into an extensive island. The eastern shore of the bay is overlooked by a smooth sloping hill, immediately under which is a small island, with an old stockade, and some houses near it.

Shelter from north-east winds may be had in Silanga bay in 12 and 15 fathoms, west of Smooth hill, taking care to keep rather on the eastern side, as the shore on which the settlement is, is fronted by coral half a mile off.

Old Castle point, the north-east limit of Tai-Tai bay, may also be considered the south-east point of Silanga bay. It is the south extremity of Castle peak peninsula, formed by the narrow isthmus separating Tai-Tai and Sharks-fin bays, and which takes its name from a peak close to the shore N. by E.  $\frac{3}{4}$  E.  $1\frac{1}{4}$  miles from the point.

Vessels proceeding into Silanga bay should haul close round Lion rock (a steamer may pass inside it), in order to avoid the Royalist reef, and enter to the north-east of Silanga islands, keeping a good look-out for discoloured water.

**North Tai-Tai, Castle, and Elephant Islands.**—North Tai-Tai, the southernmost island immediately fronting Tai-Tai bay, is North nearly a mile from South Tai-Tai island; its formation contrasts strongly with Castle island, which is 750 high and 8 cables to the N.N.W., the channel between having depths of 25 fathoms in it. Elephant island lies about a quarter of a mile northward of Castle island, and has a reef awash at three-quarters of a mile to the eastward.

Snake rock, about 60 feet high, lies to the eastward distant  $3\frac{1}{2}$  miles from the summits of these three islands, which bear respectively S.W. by W.  $\frac{1}{4}$  W., W.  $\frac{1}{2}$  S., and W.  $\frac{1}{2}$  N.

**Two-fathoms Shoal.**—There is a bank with 2, 4, and 6 fathoms, coral over it, about a mile in extent north-east and south-west, lying to the north-westward of Snake rock. From its shoalest part Snake rock bears S.E. by S.,  $1\frac{1}{2}$  miles; highest part of Elephant island W. by S.  $\frac{1}{2}$  S.  $2\frac{3}{4}$  miles; and the south summit of South Passage island N.E. by E. nearly  $3\frac{1}{4}$  miles.

**South Passage, Iguano, and Dumbell Islands.**—South Passage island,  $1\frac{1}{2}$  miles in length north and south, lies in the offing of Tai-Tai bay,  $7\frac{3}{4}$  miles N.E. by N. of South Tai-Tai island, and nearly 5 miles S.E. by S. of Old Castle point.

Iguano, the northernmost island in the entrance of the bay, is  $5\frac{1}{2}$  miles to the westward of South Passage island and N.  $\frac{1}{2}$  W. nearly  $2\frac{3}{4}$  miles from Elephant island, the passage between which is  $2\frac{1}{2}$  miles wide and has 27 fathoms in it, being the best to enter the bay; its south point has a reef extending 2 cables off, which on the eastern side of the island projects half a mile.

There is also some rocky ground, on which the *Royalist* struck,  $1\frac{1}{2}$  miles to the eastward of Iguano. It will be avoided by keeping the east extreme of the land under Castle peak to the westward of North, until the south point of the island bears West.

A 4-fathoms bank, half a mile in extent, with probably less water on it, lies S.W.  $1\frac{3}{4}$  miles from the south head of Iguano island, and N.W.  $\frac{1}{2}$  N.

2½ miles from the summit of Elephant island; the depth in its immediate vicinity is 16 and 17 fathoms.

Dumbell is a remarkable double headed island with a rocky islet a cable off its south-east point, W.  $\frac{3}{4}$  N. 4¼ miles from Iguano and 2½ miles E.N.E of Polarican. A small double island also lies W.  $\frac{3}{4}$  S. nearly 3 miles from Iguano, and between is a rock, with 15 feet water over it, and 17 and 19 fathoms close to, from which Double island bears W.S.W.; S.W. Silanga island N. by W.  $\frac{1}{4}$  W., and the summit of Iguano island East.

A coral patch with 9 feet on it lies N.N.W.  $\frac{1}{4}$  W. nearly a mile from Dumbell island.

**The Silanga Islands**, three in number, lie off the entrance of Silanga bay, each being surrounded by a reef barely a cable in extent; but to the south-east of the centre island there is a patch lying 3 cables from it.

The soundings in the neighbourhood of these islands are 17 and 20 fathoms; between them and Iguano island they are 23 fathoms, and between the latter and Lion rock 24 and 25 fathoms.

**Tides.**—It is high water, full and change, in Tai-Tai bay at 9 h. 30 m.; springs rise 5¾ feet.

**COLLINSON, DOME, MONTERO, and GIMENEZ ISLANDS** are a group of four large and several smaller islands fronting Castle peak peninsula.

Collinson island, the south-east and smallest of the four, 3½ miles in circumference, lies nearly East 5 miles from Castle peak, and has to the north-west of it Dome (1,020 feet above the sea) and Montero islands, each being separated from the other by a channel from 2 to 4 cables wide.

Gimenez island, the largest of the group, 6½ miles in circumference, is a mile to the northward of Montero, from which several small islands extend in a northerly direction towards Knob and Triple, and Smith islands.

Other islands and cliff rocks also lie about this group; the easternmost of which, Broken island, is cleft to its base at the north-east end. It is E. by N. 3¼ miles from Gimenez island, and has a small rock out of water at a cable off the south-east face.

At 8 cables E. by N.  $\frac{1}{4}$  N. of a remarkable red cliff rock on the east side of Dome island, is a rock awash, with the summit of Frances island, 1¼ miles north-east of Dome island, bearing N.N.W.  $\frac{3}{4}$  W., and the east extreme of Collinson island, South.

There are also some rocks, awash and out of water, midway between Frances and Gimenez islands; and many of the points of the large islands have reefs and rocks, generally out of water, projecting from them.

It is recommended not to take the passages between the islands forming this group, as they have not been thoroughly surveyed, although the



soundings around are deep, viz., 20 and 30 fathoms. The safest channel is inside it altogether (where also good shelter from the prevailing wind may be had), entering from the south between Castle peak and Latitude island, off the south end of Montero island, where the channel is  $1\frac{1}{4}$  miles wide, with 33 fathoms, and passing to the northward between Knob and Triple and Boswell islands, where it is one mile wide.

The depths throughout this channel vary from 20 to 30 fathoms, mud. Caution is requisite not to approach too near the north-east extremity of Castle peak peninsula, as some rocky ground, on which, as yet, not less than 5 fathoms have been found, extends  $1\frac{1}{2}$  miles in that direction from it.

**Three-Fathoms Patch.**—Some islets lying on the north side of this peninsula have also reefs off them; N.E.  $\frac{1}{4}$  N.  $1\frac{1}{2}$  miles from the easternmost of which, and S.  $\frac{1}{4}$  E.  $1\frac{1}{4}$  miles from Pigeon island, is a 3-fathoms coral patch.

To avoid this patch, and also the rocky ground above mentioned, keep Pigeon island, lying S.S.E.  $\frac{1}{3}$  E.  $2\frac{1}{4}$  miles from Triple peak, shut in with the east extreme point of Knob and Triple island noticed beneath.

**SHARKS-FIN BAY**, immediately to the northward of Castle peak peninsula, is  $2\frac{1}{2}$  miles wide at the entrance, and is formed on the north by an island (connected at low water with the shore), 5 miles in extent, on which are two remarkable peaks, called Knob and Triple.

Reefs from the northern shore stretch nearly half-way across the entrance, which, together with a spit off the point on the south side, contract the channel into the bay to 8 cables wide. Three-quarters of a mile inside the entrance, the depths are 16 and 18 fathoms. There is a small island a mile from the shore on the west side, and two others in the bottom of the bay to the southward.

On the reef which connects Knob and Triple with the shore is a very remarkable precipitous limestone island, the summit assuming somewhat the shape of a crown.

**Smith Island**,  $13\frac{1}{2}$  miles to the northward of Collinson island, and 5 miles north-eastward of Knob and Triple island, is  $2\frac{1}{2}$  miles in extent, having at the south point a remarkable rocky lump, 60 feet high, three-quarters of a mile south-east of which is a rocky islet, resembling in form somewhat that of a bishop's mitre.

There is a small island, with a long sandy tongue on its south-east side, on the west face of Smith island, and between the latter and Iloc island is a sand-bank surrounded by a reef, with 20 fathoms between it and the north point of Smith island.

**Iloc or Austin Island**, lying  $1\frac{3}{4}$  miles north-west of Smith island and  $6\frac{1}{2}$  miles east of Santa Monica, is 4 miles in extent N. by E. and

S. by W., and has, off its north-east extreme, a smaller island with a rock out of water in the middle of the channel separating them. The western side of this island appears bold to approach, the depths within half a mile being 16 and 17 fathoms. It has, however, been but partially sounded.

**Cleopatra Island** lies North  $2\frac{1}{4}$  miles from the eastern side of Knob and Triple island, 4 miles to the westward of Smith island, and  $3\frac{1}{2}$  miles from the shore. It is  $2\frac{1}{2}$  miles in extent, has an undulating summit, and some detached rocks out of water, off the north point. A coral spit projects to the eastward 4 cables from the south point of the island, to the southward of which, lying respectively at half and one mile from it, are two rocks out of water.

**The Coast** of Palawan between Knob and Triple island and Santa Monica, about  $7\frac{1}{2}$  miles to the northward, is fronted by rocky ground, which in some places extends upwards of a mile from the shore.

North and South 'rocks, always above water, lie off it, in a N. by W. and S. by E. direction,  $2\frac{1}{2}$  miles apart, the latter being 2 miles from the shore, and nearly  $2\frac{1}{2}$  miles north of Knob and Triple; in a direct line between these rocks are two patches of 3 and  $3\frac{1}{2}$  fathoms, coral, with 10 and 16 fathoms outside.

**Santa Monica**, the northernmost settlement of the Spaniards on the east coast of Palawan, is situated in a small bay immediately under East peak, (page 223), the stockade being built on a small projecting head, with a few houses at the back amongst some cocoa-nut trees. The population in 1850 was about 100, and in other respects the station is similar to those previously described.

**Darcotuan Bay.**—Darcotuan point, forming the south extremity of the bay of that name, is N. by W.  $2\frac{1}{2}$  miles from Santa Monica, and has a small rock close to it, from which Cabuli island, off the North point of Palawan, (described in page 224,) is distant nearly  $5\frac{3}{4}$  miles to the N.N.E.

Bay island occupies a central position in this bay, about a mile from the shore, and has on the south side some reefs which stretch nearly two-thirds of the way towards Darcotuan point. Reefs, awash, also extend 8 cables in a northerly direction from the latter, with 13 fathoms close to.

In the northern part of the bay are the North and South Brother islets, lying a mile to the south-east of the opening between Cabuli and Palawan. The depth immediately outside them is 25 fathoms, but in the direction of Bay island it is only 12 fathoms, mud.

**The Soundings** off Santa Monica, and between Hastings and Observatory islands, and the Palawan shore, vary from 20 to 25 fathoms, and east of Cabuli island to 40 fathoms, the bottom consisting chiefly of stiff calcareous mud.

## CHAPTER XII.

NORTH POINT OF PALAWAN TO NORTH-WEST POINT OF LUZON, INCLUDING THE LINAPACAN AND CALAMIANES GROUPS.—WEST AND NORTH-WEST COASTS OF MINDORO.—LUBANG ISLANDS.—SOUTH-WEST AND WEST COASTS OF LUZON.—SCARBOROUGH, TRURO, PRATAS, AND HOSSACK SHOALS.

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VARIATION  $0^{\circ} 50'$  East, in 1879.

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**Hastings Island**, situated 7 or 8 miles eastward of the north point of Palawan, is  $2\frac{1}{2}$  miles in extent N.W. and S.E., and has several summits, the highest being near its south extremity, where, just detached from the point, is an islet head and some rocks awash. Immediately off the north-west point is a somewhat flat cliffy head, named Base cliff, and to the northward of the island, between it and Square-top group off Observatory island, are two peaked islets.\*

**LINAPACAN ISLAND** is the largest of an extensive group lying between the north-east coast of Palawan and the Calamianes, distant 11 or 12 miles from the former. It is about 10 miles in extent, east and west, and has on the north side two deep bays with several islets and rocks lying off their prominent points. In the eastern bay are several steep conical heads; and in the south-west corner is the Spanish settlement of St. Nicholas, comprising a stockade and a few houses. There are 19 fathoms water at a mile from the settlement; but the approach to the bay has not been sounded, and no part of the southern face of the island has been examined.

Several islands and peaked rocks lie between the north side of Linapacan and Calamian island; and to the south-eastward there are also some small groups of islands.

**Observatory Island**, lying E. by N.  $\frac{1}{2}$  N. 10 miles from Cabuli, is the north-westernmost of the Linapacan group. It is 758 feet above the sea, and when first seen, on making Palawan from the northward, appears like a conical hill. The island is  $1\frac{1}{4}$  miles in extent, N.N.W. and S.S.E., and has at its north extreme a saddle head, with a slip or

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\* See Admiralty chart:—Palawan island, No. 967: and St. Bernardino strait and islands adjacent, No. 2,577 scale, degree = 6 inches.

water-course down it, connected by a low neck of land, on either side of which are sand bays.

A small rocky point, where observations were usually taken, in the bay on the west side of Observatory island, is in lat.  $11^{\circ} 30\frac{1}{4}'$  N., long.  $119^{\circ} 39' 33''$  E.

The channel between Observatory island and Linapacan is barely  $1\frac{1}{2}$  miles wide, and has upwards of 30 fathoms water. A strong current (depending in velocity and direction on the prevailing winds) will be found usually setting through it.

**Square Top Group**, consisting of four islands and some peaked rocks, lie off the south-west face of Observatory island; from the largest island of this group Hastings island bears S.S.W. 3 miles.

**Base Reef**, lying N.W. by N. nearly  $3\frac{3}{4}$  miles from the high part of Observatory island, is about the size of a large boat, and between it and the saddle head are two rocks awash.

**Tides**.—It is high water, one day after full and change, at Observatory island at 11 h.; maximum rise observed,  $5\frac{1}{4}$  feet. The half tides in the month of May occurred during the day.

**The CALAMIANES** are a group of high islands lying between the north-east end of Palawan and Mindoro, and extending between the parallels of  $11^{\circ} 39'$  and  $12^{\circ} 20'$  N., and the meridians of  $119^{\circ} 47'$  and  $120^{\circ} 23'$  E. Busuanga, the largest island of the group, is about 34 miles in extent, N.W. by W. and S.E. by E., and 18 miles broad. It is very irregular in form, being indented with numerous deep bays. The islands and reefs which front its north-east side, form the western side of Northumberland strait.

H.M.S. *Thistle*, 1878, obtained 11 to 16 fathoms on a coral bank about 250 yards in extent, 7 miles east of Busuanga, in lat.  $11^{\circ} 59'$  N., long.  $120^{\circ} 32'$  E.

**Calamion or Culion island** lies off the south-west side of Busuanga, from which it is separated by a strait about 3 or 4 miles wide in its narrowest part, and in which are numerous islands, rocks, and shoals. Calamion is 19 miles long, N. by W.  $\frac{1}{2}$  W. and S. by E.  $\frac{1}{2}$  E., and its greatest breadth, near the middle of the island, is nearly 10 miles. It is also of very irregular shape on the side next Busuanga, but its western side, which alone concerns the navigator, is nearly straight, in the direction of the greatest length of the island. Close to the south-western extreme is Dicabaito, a small island which is distant nearly 10 miles from the nearest part of Linapacan.

Upon the west side of Calamion, in lat.  $11^{\circ} 45'$  N., is a small island at the entrance of a narrow inlet or harbour running into the island in a north-easterly direction about 5 miles. A reef, with some rocks above

water upon it, projects about a mile to the south-westward of this island; and a little over 3 miles N.W. by W. from it is an islet or rock, surrounded by a reef, which is nearly 2 miles distant from the nearest shore.

**ISLANDS and DANGERS WESTWARD and NORTHWARD of the CALAMIANES.**—Galoc is the name of a long narrow island lying close off the north-western extreme of Calamion. It is surrounded by a reef which projects from its south-western end nearly a mile. Close off its northern part, and about a third its size, is an island named Popototan, from the western point of which a reef extends more than a mile to the south-westward.

From Popototan a chain of islands and dangers extends across the strait which separates Calamion from Busuanga, and other islands and dangers extend several miles to the northward; it is, however, only the outer of these that concern the navigator, and the following description of them is principally from Horsburgh.

Green island or Nalaut, in lat.  $12^{\circ} 3' N.$ , long.  $119^{\circ} 47' E.$ , and the westernmost island hereabout, is of moderate height, covered with trees, and visible 15 miles off; it is surrounded by a coral reef, extending about one-third of a mile. About 3 or 4 miles north-west of the island, the *Discovery* got overfalls on a coral shoal, but did not find less than 5 fathoms; to the eastward of the island 23 fathoms were found, and 9 and 10 fathoms close to the reef.

The Haycock, in lat.  $12^{\circ} 9' N.$ , long.  $119^{\circ} 48\frac{1}{2}' E.$ , is a high rocky island, about two miles off the western part of Busuanga, and may be seen 18 or 20 miles. About  $2\frac{1}{2}$  miles West of the Haycock soundings of 26 fathoms were found, with overfalls, 19 fathoms about 6 miles off, and 30 fathoms about 11 miles off.

Elet is the name of a  $2\frac{1}{2}$ -fathoms patch, which lies close to the westward of two small islets, joined by a reef to a point of the north-west part of Busuanga, N. by E. distant about 4 miles from the Haycock.

Pinnacle rock, in lat.  $12^{\circ} 19\frac{1}{2}' N.$ , and about 2 miles West of the north point of Busuanga, is a very sharp rock above water, having 25 fathoms water about 2 miles westward of it, and 12 fathoms about a mile off.

Calivite, Dimipac, or High island, in lat  $12^{\circ} 21\frac{1}{2}' N.$ , long.  $119^{\circ} 53\frac{1}{2}' E.$ , by Captain Ross, I.N., lies about 2 miles to the northward of the north point of Busuanga. It is a small island, not quite 2 miles in extent, and the channel between it and Busuanga does not appear to be free of danger, as some rocks were seen above water eastward of the island.

About a mile north-westward of Calivite island are rocks above water, one of which, named Sail rock, is very remarkable; and  $1\frac{3}{4}$  miles north-westward of this lies a large black rock, named N.W. rock or Dichilem, in lat.  $12^{\circ} 24\frac{1}{4}' N.$ , long.  $119^{\circ} 52' E.$  When passing between these the

*Discovery* had 38 fathoms, and about 2 miles N.N.E. of N.W. rock, passed over a coral spot in 8 fathoms.

Calocoto, or North rock, in lat.  $12^{\circ} 28' N.$ , long.  $120^{\circ} 1\frac{1}{2}' E.$ , is a high black rock, having three others a short distance westward of it. It is the northernmost of the islands which lie on the east side of Busuanga, and may be seen 13 or 14 miles from the deck.

**Soundings.**—The charts exhibit no soundings within 20 miles of the west side of Calamion, but beyond that distance are irregular soundings, 19 to 54 fathoms. In lat.  $11^{\circ} 52' N.$ , long.  $119^{\circ} 26' E.$ , is a patch of 9 fathoms, with other patches, 12 to 15 fathoms, within a few miles of it. The soundings near the islands westward and north-eastward of the Calamianes have been given with the description of those islands; they are also very irregular, 17 to 30 fathoms, with patches of 5 and 8 fathoms, and it would appear necessary to be on the look-out for shoal water when navigating in this locality.

A doubtful patch of 5 fathoms is shown on the charts 14 or 15 miles to the northward of the north point of Busuanga, in about lat.  $12^{\circ} 35' N.$ , long.  $119^{\circ} 52' E.$

**HUNTER and MEROPE SHOALS** lie at the entrance of Mindoro strait, out of the ordinary track of vessels passing up and down the China sea, but they may be considered to form the eastern limit of the China sea route between the Calamianes and cape Calavite, the north-west extreme of Mindoro. Hunter shoal, in lat.  $12^{\circ} 40' N.$ , long.  $120^{\circ} 12' E.$ , is stated to have been examined by Mr. Hunter in 1842. It is said to lie 14 miles W.  $\frac{1}{4}$  N. from Appo island, to be about 300 yards in extent, with depths on it varying from 3 to 4 fathoms, and rocky patches of 9 and 11 feet.

Merope shoal is said to lie about 5 miles north-eastward of Hunter shoal, in lat.  $12^{\circ} 43\frac{1}{2}' N.$ , long.  $120^{\circ} 16' E.$  It is thus described by Captain George Blaxland: \*—"W.N.W. from the island of the outer edge of Appo shoal, distant 10 or 12 miles, lies a rocky patch with  $2\frac{3}{4}$  fathoms on the shoalest part, with a line of soundings of 10 fathoms for some distance, the whole length about one mile; the boats of the *Merope* and two London whalers have been on it several times."

**The WEST COAST of MINDORO ISLAND** has no soundings off it excepting in the bays, or within one or 2 miles of the shore in some places. In the interior double and treble chains of mountains extend through the island, and some low points of land project from them into the sea.

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\* Nautical Magazine, 1842, page 286.

**Garza bay**, formed between points Buruncan and Ylin, the south extremes of Mindoro and Ylin islands, is safe throughout, affording excellent anchorage and shelter from northerly winds at the mouth of the strait in 10 or 12 fathoms. Garza island and its extensive shoal also offers shelter from strong easterly gusts.

The strait between Ylin and Mindoro is free from danger, but owing to the prevalence of light airs should not be attempted without a fair wind. Caution must be used when entering Garza bay from the northward by this strait, for the spit off Mindoro shoals suddenly from 10 to 3 fathoms. Keep the channel well open, therefore, borrowing rather on Ylin until Garza is nearly locked in by the eastern point, then haul easterly, anchoring in 12 fathoms.

This neighbourhood, particularly Mangarim, the principal settlement of Mindoro, had been reported, by a Spanish officer who had commanded a gunboat, to abound in stock, water, &c., and much attention was directed to these matters, as likely to be of importance to vessels making this passage from Batavia, Macassar, or Basilan strait. Indeed, it is immediately off this place that the *Young Queen* was fallen in with, distressed by want of water, which might have been readily obtained at Ylin without inconvenient delay had the coast been known.

No inhabitants were noticed in Garza bay.

**Mangarim Bay.**—H.M.S. *Samarang* passed through the strait, between the south-west part of Mindoro island and Ylin island, anchoring off Mangarim bay, the *Royalist* being moored within the sandy tongue which is in lat.  $12^{\circ} 20' N.$ , long.  $121^{\circ} 2' 8'' E.$

The interior of the bay is very shoal, and the settlement,  $1\frac{1}{2}$  miles N.E. of the spit, only accessible to light boats. There is no inducement to visit Mangarim: little was offered, and that excessively dear, and water fit for consumption was not found; indeed, the marshy unhealthy location should be avoided.

**Ylin Island** fronts the south-west part of Mindoro, covering a space of 10 miles in a N.N.W. and S.S.E. direction. The south extreme is bold-to on all its faces. Hence easterly, with the previous warning for the tail of the Garza shoal, no dangers are known. Northerly, the passage up to the town by the channel is safe, if it can be run with a free wind; but it is safer to pass outside Ambolon, bearing in mind that the tail of the southern shoal, lying off the latter island, is exactly on the line of contact of Ylin and Ambolon extremes at the moment that Ambolon outer point shows clear of the smaller attached island. Indeed, the reef with this warning is so manifestly to be seen that no excuse will warrant the oversight, notwithstanding the deep water between it and the island.

**Supplies.**—The town of Ylin will be found in lat.  $12^{\circ} 15' N.$ , one mile to the northward of Ambolon island. A reef extends seaward half-a-mile, off which, with the southern large house bearing East, good anchorage will be found in 10 fathoms. A channel, staked by the natives, leads up to the settlement, where a stream delivers itself into the sea ; but much sweeter water was found trickling over a cliff just round the town point, to the southward, to which the boats had easier access, and from which the *Samarang* was readily completed with water. Of the other source, a most excellent run of water was found, but used for all purposes by the people, and difficult to embark, excepting at high tide, owing to the shore being dry at least a cable from the mouth of the stream. Fowls, eggs, grain, and vegetables were procured at reasonable prices. Cattle were stated to be abundant at Mangarim.

**Ambolon Island.**—The dangers on the sea-board of this island are all visible, and easily avoided.

On the meridian, or  $2\frac{1}{2}$  miles North of Ambolon, a shoal as well as a spit to the W.N.W. from Ylin must be avoided ; and 5 miles North, two coral banks, one dry at low water, cover the entrance to Mangarim bay.

The safe channel in, will be found by passing the northern dry patch on its northern side, and the next dry patch ( $2\frac{1}{4}$  miles easterly) on its south, anchoring the moment the channel between Ylin and Mindoro is fairly open.

**APPO SHOAL**, lying between the west coast of Mindoro and the island of Busuanga, was examined by the surveying ships *Discovery* and *Investigator*. Its northern extremity is in lat.  $12^{\circ} 45' N.$ , long.  $120^{\circ} 29' E.$  : from thence the shoal extends S.E. by S.  $7\frac{1}{2}$  miles, where it forms a very narrow spit or east point, in lat.  $12^{\circ} 40\frac{1}{4}' N.$ , long.  $120^{\circ} 34' E.$  ; from the east point to the southern extreme bears S.  $35^{\circ} W.$ , distant  $5\frac{1}{2}$  miles, and between the two points there are several gaps in the shoal, having 9 feet water. On the western side there are two islands ; the western one is largest, being about half a mile in diameter, and covered with trees ; white beaches line its northern and eastern sides, and a surrounding reef projects about half a mile. This island does not appear to be connected with the Appo shoal, but about  $1\frac{1}{2}$  miles E.N.E. of it there is a small island, formed of barren black rocks, on the south-west part of the shoal. The large island is in lat.  $12^{\circ} 39' N.$ , long.  $120^{\circ} 26' E.$  ; from its centre the north point of the shoal bears N.  $24^{\circ} E.$ , distant 7 miles ; the eastern point E.  $9^{\circ} N.$ .. 8 miles ; and the south point S.  $56^{\circ} E.$ ,  $6\frac{3}{4}$  miles.



The whole extent of the shoal is 10 miles from its north to the south point, and 9 miles from its east point to the western part of the large island. There are two high black rocks N.E. of the small island, which may be seen about 6 miles off, and the islands in clear weather are visible from an elevation of 20 feet, about 10 miles. At low water many small rocks are dry on the shoal, particularly along its north side.

A small round bank of coral rocks, (Discovery bank) on which the *Discovery* anchored, and found the least water to be 9 fathoms, lies 7 miles eastward of the eastern point of the Appo shoal. When at anchor on it, the large island on the shoal, visible halfway up the lower rigging, bore W.  $6^{\circ}$  S., and the northernmost of the two small Pandan islands off Mindoro, bore N.  $25\frac{1}{2}^{\circ}$  E., distant 7 miles (query 12 miles).

If intending to pass between the coast of Mindoro and the Appo shoal in the night, keep about 6 miles off Pandan islands, as the eastern point of the shoal is narrow, and should the wind be westerly, it would not readily be perceived, nor would there be breakers to make known the approach to danger. Whilst examining the Appo shoal, the *Discovery* and *Investigator* were frequently near it without obtaining soundings, and the boats found it very steep-to in all parts. Land and sea breezes were experienced here in March, the latter from West and S.W., with the tide or current setting northward; land and sea breezes prevailed also to the westward of the Calamianes.

Sir Edward Belcher remarks:—The extent of the Appo shoal has yet to be defined, but the eastern limit and the position of the islets bounding it were determined by the *Samarang*. The inner island, of bare white limestone rock, is on the reef, and distant  $1\frac{1}{2}$  miles from the greater island, which is covered with trees. The channel between the island and reef is navigable and safe, but a reef extends off the western extreme of the island. All dangers between the island and reef are clearly visible, and working through, soundings were not obtained with 60 fathoms.

**Sublayan Anchorage**,\* situated 37 miles north of Ambolon, is open to the southward; anchorage may be obtained in 7 or 8 fathoms about 3 miles East of Sublayan point, small vessels may anchor further in; there is a black buoy on the west and a white buoy on the east side of entrance to the inner anchorage, with 9 feet water between them.

**Paluan bay** (House Cliff),\* affords excellent shelter in the north-east monsoon, and is also a convenient place for vessels to obtain supplies when passing through Mindoro strait. The bay is 5 miles wide at entrance, of a semi-circular form, running back 3 miles in a northerly direction.

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\* The description of this bay is by the late Captain W. T. Bate, R.N., of H.M.S. *Royalist*. See Admiralty plan of Paluan bay on sheet, Ports in the Philippine Islands, No. 972, and 949.

There are no dangers in it. Reefs, dry at low water, extend a quarter of a mile from either point of entrance, having deep water close to them. The soundings at the entrance are from 45 to 50 fathoms, half a mile to the southward of which they increase to 200 fathoms.

The best anchorage is in the north-eastern extremity of the bay in 14 fathoms (to which the water suddenly shoals from 20 fathoms), less than a mile from the beach, and West from a small isolated head, upon which a hut is erected. There is a black rock close to it, standing a few yards in front of a sandy beach, which shows in good relief. The bottom consists of a black tenacious mud, from which it is difficult to extricate the anchor after it has been down a few days.

**Water.**—A small river disembogues immediately on the north side of the cliff, where good water can be obtained with facility; and on the beach there is plenty of drift-wood. The coral projects half a mile from the entrance of the river, and has 10 and 12 fathoms close to its edge.

**CAUTION.**—Care must be taken when working into Paluan bay, for the squalls come violently off the high land, are very sudden, and at night do not give the least warning.

**Cape Calavite**, the north-western extreme of Mindoro, is in lat.  $13^{\circ} 26' N.$ , long.  $120^{\circ} 18' E.$  Between it and Paluan bay there are soundings near the shore, which is bold to approach; for the few rocks interspersed along this part of the coast, adjacent to the cape, lie close in, and one of them, just above water, has a sandy beach adjoining, upon the projecting part of the coast that forms the cape. Over this point stands mount Calavite, which is of regular sloping form, and visible at a great distance in clear weather.

**FLYING CLOUD ROCK.\***—The ship *Flying Cloud*, on the 7th April 1854, is reported to have struck on a sunken rock, with 6 to 12 feet water on it, and about 30 or 35 feet in diameter; it is said to lie in lat.  $13^{\circ} 28' N.$ , long.  $119^{\circ} 34' E.$  (approximate).

**LUBANG ISLANDS.**—Lubang, extending about 16 miles nearly N.W. and S. E., is the largest island of a detached group that fronts the south-west end of Luzon and the north-west end of Mindoro; it is high in the middle, but low at each extreme.† Ambilor or Amul, to the eastward of it, is a high conical mountain, about 2,500 feet high. The northern part of Lubang is lined by a reef, on which the Company's ship *Regent* was driven and wrecked, after having struck on one of the shoals off the south-west end of Palawan, where she lost her rudder.

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\* Flying Cloud rock was unsuccessfully searched for by H.M.S. *Serpent*, 1865.

† Mr. J. Phillips, Master, H.M.S. *Vigilant*, 1863, remarks that the northern part of Lubang is very low land, and when coming from the southward, the northern extreme of the high land in the centre may be mistaken for the end of the island.

**Golo Island**, a high but long narrow strip of land, 8 miles W.N.W. and E.S.E., with reefs off its north-east, east, and south-east points, adjoins the south-eastern extreme of Lubang. The south side of Golo island must be approached with caution; coral reefs extend about one cable from the shore. H.M.S. *Teazer*, 1872, anchored in 13 fathoms, mud, off this part of the island, with cape Calavite bearing S.  $\frac{3}{4}$  W., and S.E. extreme of Golo island S.E. by E.  $\frac{3}{4}$  E. About a quarter of a cable nearer the shore 4 and 5 fathoms, coral, were obtained.

Looc bay, on the east side of Lubang, is thus described by Sir E. Belcher:\* —“On the eastern end of Lubang island, and covered by Ambil island, is the very snug port of Looc, which affords safe retreat in the event of accident in passing Calavite, or during the passage by the strait of Bernardino. It is pretty free from dangers at the mouth, and good holding-ground will be found in depths between 10 and 20 fathoms. Within the former depth it suddenly shoals, and several lines of coral ledge bar the inner depths of the bay from direct access, although excellent shelter would be found by a vessel moored between these barriers, to which they might easily be conducted. At the village a brisk rivulet supplies most excellent water, but boats cannot fill except at high water.”

In approaching the bay caution must be observed, as a  $3\frac{1}{2}$ -fathoms patch is marked on the chart about  $2\frac{1}{2}$  miles to the eastward of the southern horn of the bay. Water, as well as wood, are easily procured, but bullocks, stock, vegetables, &c., are at the same (or higher) prices as Manila.

Another port was indicated on the north side of Lubang. It was cursorily viewed by the *Samarang* in passing, and appeared to be merely sheltered by a reef lying parallel to the coast. It might afford shelter to a steam vessel, but ingress and egress, unless in very favourable weather, owing to its being on a lee shore, is questionable for a sailing vessel. The village is named Tagbach, and may afford supplies to passing vessels which send their boats. It was reported to be a gun-boat rendezvous.

Northward of Ambil are some rocks, and the islets of Mandani and Malavatuan. To the northward of these islets are shoal patches, but the least water over them appears from the chart to be 6 fathoms, the soundings round about being 36 to 50 and 90 fathoms. Westward of Ambil, and 2 or 3 miles from the northern shore of Lubang, are two rather extensive shoals named Ambit and Afuera banks.

Cabra, or Goat island, the south-western extreme in lat.  $13^{\circ} 52\frac{1}{2}'$  N., long.  $120^{\circ} 2\frac{1}{2}'$  E., is the outer or westernmost island of the Lubang group, and its south-east point nearly joins the north-west end of Lubang; it is a low, flat,† woody island, with a reef of foul ground projecting from

\* See Admiralty plan of Looc bay, on sheet, Ports in the Philippine islands, No. 972.

† Mr. J. Phillips observes that Cabra is of moderate height, about 200 feet, and very even.

its north end. Sir E. Belcher remarks :—"Some doubt existing as to the true position and the dangers reported to extend off this island, a day was devoted to establish this turning point of the navigation of these seas."

"The *Samarang* grazed the island on its eastern side, rounding to and anchoring off its southern face. The distance usually observed in passing land is the only question to be noticed here. No dangers requiring express caution exist. It has also been passed by the *Samarang*, very close on the west side, much within the range that any merchant vessel could try, without the appearance of danger. In the voyage of H.M.S. *Sulphur*, it is observed,—“Both the *Starling* and *Sulphur* shaved the surf-line of Cabra without obtaining soundings ; therefore, the dangers reported to lie to the northward of this island are incorrectly stated.”

**The CHANNEL Eastward of the LUBANG ISLANDS**, and also between them and Mindoro, is frequented by the Spanish vessels, when going to or coming from Manila. The *Samarang* worked through this channel easterly, and Sir Edward Belcher remarks :—"It is important to remind seamen that from about 4 to 6 a.m. those who frequent this coast state that sudden heavy squalls may be expected off-shore, and as vessels are compelled to carry a press of sail to make progress, they should shorten before they tempt Calavite ; and this especially applies to close working to get through the channel between it and Lubang. Even with caution a flurry took two jib-booms in succession between 6 and 10 a.m. The advantage gained by this channel, which is free from danger as to pilotage, was manifest, as it enabled us, having cleared the channel at 3 p.m., to reach the entrance of Manila bay with a free wind at 10 p.m."

**Minerva Rock.**—Vessels passing eastward of the Lubang group and approaching cape Santiago or St. Jago, the south-west point of Luzon, should be careful to avoid the Minerva rock, which seems not to have been noticed by navigators, until the *Minerva*, of Alloo, Captain Robertson, bound from Sidney to Manila, struck on it at 2 a.m., September 10th, 1834, although an American ship had been wrecked on it several years previously. It is said to be a coral rock, having 17 fathoms water near it, and bearing from cape Santiago S.E.  $\frac{1}{2}$  E., distant 4 or 5 miles.

There is a signal station on cape Santiago.

**Fortune Island**, in lat.  $14^{\circ} 2' 45''$  N., long.  $120^{\circ} 28' 34''$  E., is shown on the chart as about a mile in extent, with some rocks off its eastern side. Sir E. Belcher observes :—"The island is safe to, and, like Cabra, requires but the seaman's attention."

**Simo Bank.**—In about lat.  $14^{\circ} 4'$  N., long.  $120^{\circ} 16'$  E., 14 or 15 miles northward of the Lubang group, and 12 or 13 miles W.  $\frac{3}{4}$  N. from

Fortune island is a bank 4 or 5 miles in extent, with 7 to 11 fathoms water over it, and irregular soundings, 21 to 109 fathoms, near it.

**SOUTH-WEST COAST of LUZON.**—We have no description of the land between cape Santiago and Manila bay, and this part of the coast is quite out of the ordinary track of vessels proceeding up and down the China sea. The coast line appears by the chart to trend from cape Santiago in a north-westerly direction for 4 or 5 miles, thence to the northward 10 or 11 miles to San Diego point, which appears to be low and sandy. This latter part is fronted by a reef which projects in places more than 2 miles from the shore.

Fuego point bears about N. by W. 10 miles from San Diego point, and just to the northward of the latter is Lian bay, and about midway between the points is the anchorage and town of Nasugbu. Two or three miles southward and south-westward of Fuego point, fronting a small bay, are several islets and rocks.

From Fuego point the coast line takes a direction about N. by E. to Limbones island, which lies close off a point of the main; in this space are some bays and islets, with anchorages off them. From Limbones the coast recedes to the north-eastward, forming the southern part of Manila bay.

The soundings off this part of Luzon are deep and irregular, 30 to 110 fathoms, and afford but little or no warning when approaching the dangers, close to which are 17 to 60 fathoms; consequently the navigator will have to approach the coast with proper care and caution.

**MANILA BAY** is about 30 miles in extent each way, and the land on both sides is high.\* The city of Manila, situated at the mouth of Pasig river (page 263), on the eastern shore of Manilla bay, about 25 miles from its entrance, is the capital of Luzon, one of the largest of the Philippine islands, and the seat of the Spanish Government in the east. The city is large and convenient for trade, the country adjacent producing excellent indigo, sugar, tobacco, hemp for cordage, &c.; but the inhabitants around are indolent. Its chief dependence was formerly on the trade to Acapulco, carried on in two or three ships, which usually sailed in March or April from that place, and arrived at Manila in August or September, but not always regularly; † now, however, it has a considerable trade with all parts of the world.

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\* See Admiralty chart of Manilla bay, No. 976; scale,  $m = 0.5$  of an inch.

† These galleons did not sail together, nor exactly at stated periods, from Manila, but usually in July or August; they sometimes went round the north end of Luzon, at other times through the straits of Manila or St. Bernardino, and arrived at Acapulco about Christmas, or generally between the early part of November and middle of January. They sometimes arrived at Manila in July, and usually made Samar island about cape Spirito Santo, then came in by St. Bernardino strait.

The imports of Manila are chiefly British manufactures, linens and cottons, hardware, and articles of British produce; French and German toys and goods, wines, &c. Its exports are sugars, rice, hemp, tobacco, hides, and cotton; a small quantity of coffee, indigo, rhubarb, native cloths and hats.

During the months of June, July, and August, the air of Manila is rendered impure by noxious exhalations arising from the swampy land around; and the weather being sultry, with much rain at times, febrile complaints are then likely to appear.

The north-east monsoon blows strong out of Manila bay at times, accompanied by a cloud resembling smoke, which is driven out of the bay to the S.W., and forms an arch in that horizon, when the sky is otherwise clear; but sometimes sea-breezes from the S.W. blow into the bay in the north-east monsoon after mid-day, increasing in strength as you advance into the bay.

**Supplies.**—Commander C. M. Buckle, H.M.S. *Cormorant*, 1862, remarks, “that at Manila coal of all kinds may be purchased, but the price is high. For Welch coal put on board 14½ dollars per ton were paid. Newcastle or Australian coal was cheaper.

“Water can be purchased, but as the water boats have to be sent 5 or 6 miles up the river, timely notice must be given. The water in Manila, excepting the rain preserved in tanks, is brackish and very hard.

“Fresh beef is very bad, it being spoiled in the killing. If much be required, the bullocks should be purchased, and killed on board. The price is about 10 cents per lb. Vegetables are not plentiful.”

**Corregidor or Mariveles, and Pulo Caballo** are two islands dividing the entrance of Manila bay into two channels, known respectively as the North and South channels. Corregidor, the principal island, lies near the north shore, and is 3½ miles in length East and West.

There is fresh water to be procured under a steep cliff at the western end of this island, but the landing is on a stony beach, and inconvenient.

Pulo Caballo is a high bluff rock 639 feet high, of considerable size, partially covered with verdure, lying about three-quarters of a mile southward of Buri point, the eastern extreme of Corregidor.

**Lights.**—On the summit of Corregidor stands a lighthouse 60 feet high, from which is exhibited, at an elevation of 639 feet above the sea, a white light, *revolving once every half minute*, and visible in clear weather from a distance of 20 miles. A *fixed white* light is shown from the white tower on the West Mole head.

A *fixed white* light is exhibited from the low spur on the north-east

part of Pulo Caballo, 27 feet above high water mark, and is visible 6 miles. This light is concealed by high land to seaward between the bearings of N.N.E. and E. by N., and screened towards the north shore between the bearings of S. by W. and E.S.E.

A *fixed* white light, elevated 29 feet above high water, is exhibited from a lighthouse on Sangley point, the outer extreme of the low land at the entrance of port Cavite, visible in clear weather from a distance of 7 miles.

A *fixed* red light, elevated 51 feet above the level of the sea, is exhibited from a white circular tower, on the northern mole at the entrance of Pasig river, and should be visible in clear weather from a distance of 8 miles.

A *fixed* green light is exhibited from an iron stand painted red, on the battery of the southern mole, entrance of Pasig river. This light is elevated 16 feet above high water, and should be seen from off the entrance of the river, between the bearing of N.W. and S.E., at a distance of one mile; it bears South from the red light on the north mole.

**Soundings** of 50 to 40 fathoms will be obtained when within 7 or 6 miles of Corregidor, decreasing gradually to 27 or 26 fathoms about 2 miles to the westward of it.

Between Corregidor and the north shore the depths are 50 to 48 fathoms within a quarter of a mile of the island, 26 fathoms in mid-channel, decreasing quickly to 16 or 15 fathoms, stony ground, within half a mile of the north shore.

**La Monja**, the Nun, or Haycock, is a high rock, bearing from Corregidor light W.  $\frac{3}{4}$  S. distant 3 miles, with 27 fathoms water within a quarter of a mile of it all round. The soundings from it decrease regularly to 20 fathoms within a quarter of a mile of the north shore, and deepen to 29 or 30 fathoms near the north-west part of Corregidor, close to which there is a perforated rock.

**Fulton Rock** lies about a quarter of a mile off the northern shore of the entrance, N. by W.  $\frac{1}{4}$  W. from Corregidor lighthouse. There appears to be 6 to 11 fathoms near the rock, and 5 to 6 fathoms between it and the shore. The north shore, several miles north-eastward of it, is fronted by rocks, and about 3 miles north-eastward of the Fulton a bell buoy is placed to warn vessels to avoid the dangers which lie off Caucauve point.

**El Frayle**, the Friar, rock or islet, which appears like a sail, lies  $3\frac{3}{4}$  miles S.  $\frac{1}{2}$  E. from Caballo light, and nearly 2 miles from the south shore of the bay. Close around it are depths of 10 and 11 fathoms, increasing to 17 and 23 fathoms at a short distance to the westward.

**Port Mariveles**, on the north side of the entrance to Manila bay, is about a mile wide and  $1\frac{1}{2}$  miles deep, with good anchorage, sheltered from all but S.E. winds. Vessels of any size may moor here, and procure excellent water. Some rocky islets, Los Cochinos, with a rock awash just outside them, project half a mile off the south-west point of entrance. Vessels may anchor in 17 fathoms, with the village bearing N.W. by W., or they may run farther into the bay if necessary; the bottom being good holding ground, and the anchorage safe. This is a convenient place for vessels to touch at when in want of wood and water, the former being an expensive article at Manila.\*

**St. Nicholas Banks** are two shoals lying midway between Caballo island and port Cavite. The outer shoal, nearly a mile in extent, is the larger of the two, and has but 5 feet water on its shoalest part. From its outer or northern edge in 11 feet water, Corregidor light bears W. by S.  $\frac{3}{4}$  S., and Cavite church E. by N.  $\frac{1}{2}$  N. Within a ship's length to the north-westward there are 13 and 15 fathoms water, the soundings being no guide in approaching it, because the bank is so steep. Mr. J. Phillips, Master, H.M.S. *Vigilant* (December 1863), states that there is a red buoy with a ball on the northern edge of St. Nicholas bank.

**Light building**, 1878.

**Cavite**, on the eastern shore of Manila bay, is the port and marine arsenal of Manila, where vessels are built, and to which those are hove down that want repairs, it having excellent conveniences for that purpose. The town is well fortified, and stands on a low point of land, which forms a good harbour or cove, the deepest water in which appears to be  $3\frac{1}{4}$  fathoms, soft mud, with shelter from West and S.W. winds. As the water in the wells here is brackish, the inhabitants are supplied with fresh water from the river by Old Cavite.

The course from Cavite to Manila is N.N.E. 7 miles, and from the former the depths increase regularly to 7 or 8 fathoms about midway, then gradually decrease to  $4\frac{1}{2}$ , 4, and  $3\frac{3}{4}$  fathoms off Manila. With a turning wind between them, a ship may approach the shore to 5 or  $4\frac{1}{2}$  fathoms, the bank fronting it being very flat, and composed of soft mud.

**Anchorage in Manila Road.**—Horsburgh says that "A good berth is in 5 fathoms water, with the North bastion N.  $37\frac{1}{2}^{\circ}$  E., the S.W. bastion E.  $20^{\circ}$  N., the cupola E.  $37^{\circ}$  N., and the fishing stakes

\* See Admiralty plan of port Mariveles, on chart of Manila bay, No. 976.

† See Admiralty plan of port Cavite on chart of Manila bay, No. 976. This port by the chart must have filled up since Horsburgh's time, for he says there are 6 or 7 fathoms in it.



at the river's mouth N.  $18^{\circ}$  E. Large vessels generally anchor at Cavite harbour." Sir Edward Belcher observes, that anchorage may be taken up anywhere among the shipping, but the best and most convenient is in 5 or 6 fathoms, having the flagstaff of the garrison gate open to the right of the convent dome, which is within the walls. This position enables boats to fetch off under canvas, against the fresh afternoon breezes, when a very unpleasant sea prevails, which not only renders pulling in laden boats laborious, but entails wetting, a matter in tropical climates to be specially avoided, irrespective of damage to light goods.

**Pasig River.**—The entrance to this river lies between two moles extending in a W. by N. direction from its north and south points; there is a depth of 11 feet on the bar at low water, and 25 feet within the harbour. The channel leading over the bar lies in a S.S.W. direction from the northern mole and is marked by two conical red buoys, which must be passed close to. Pasig river is the principal channel of communication with the interior. It passes between the commercial districts and the fortress of Manila, and is navigable for about 10 miles; its average breadth is about 350 feet, with depths from 3 to 25 feet.

**Tides.**—It is high water, full and change, in Manila bay, at 10 h. 40 m.; springs rise about  $6\frac{1}{2}$  feet. The tides are irregular; with an easterly wind, the ebb runs out 18 hours together, between Corregidor and the north shore, pretty strong; the flood about 6 hours to the eastward, sometimes weak, at other times with considerable strength.

**Directions.\***—If intending to enter Manila bay by the North channel,—when about 6 miles to the westward of Corregidor island, steer for it; with a fair wind the common passage is between this island and the Haycock, afterwards on the north side of Corregidor. From hence to Manila the course is N.E. by E.  $\frac{3}{4}$  E., distant 25 miles, and to Cavite E. by N.  $\frac{1}{2}$  N., 22 miles. To avoid San Nicholas banks, keep the Haycock open of the northern part of Corregidor bearing W.S.W. until the steeple of Cavite church bears East, and a remarkable hummock, which stands close to the sea upon a point of land on the north shore, W.N.W.; being then clear of the shoals, steer for Cavite or Manila at discretion.

In the fair channel, between the shoals and the north shore of the bay, the depths are 17 and 18 fathoms, decreasing gradually towards that shore to 5 and 4 fathoms; and in steering eastward, the depths also decrease regularly to 5 fathoms off Cavite, where ships anchor a little more than a mile off shore in that depth, the bottom all stiff mud.

In using the channel northward of Corregidor, care must be taken not to near the north shore under a mile, in order to avoid the Fulton rock and the dangers fronting that part of the coast. It appears from the chart

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\* Principally from Horsburgh.

that the Haycock kept to the westward of S.W.  $\frac{1}{4}$  W., will lead clear of these dangers.

**South Channel.**—When the wind is blowing from the eastward, out of the bay, the current runs out through the North channel to the westward; it is therefore advisable at such times to adopt the channel between Corregidor and the south shore, there being more room in it to work to windward, and no hidden danger. To enter the bay by this channel, caution is requisite when the vessel is abreast the easternmost high land on the south shore, which bears S.E.  $\frac{1}{2}$  E. from Corregidor; for the trail of the St. Nicholas banks trends gradually towards this high land and the water may shoal suddenly in approaching them from 12 to 7 or 6 fathoms, rocky ground. Do not, therefore, come under 12 or 13 fathoms, nor under 15 or 16 fathoms when rather to the eastward, and keep the Haycock then open with the northern part of Corregidor. From 15 fathoms water, the next cast may be 7, and then 4 fathoms on the verge of the St. Nicholas banks, when the Haycock is shut in with Corregidor.

To avoid the St. Nicholas banks at night, Corregidor light must not be brought to the westward of S.W. by W.  $\frac{3}{4}$  W.

Within three-quarters or half a mile of the eastern part of Corregidor there are 22 and 23 fathoms; and when it can be rounded, stand over for and work along the north shore, which has 15 or 16 fathoms at a quarter of a mile, and 10 or 12 fathoms about a cable off; although, in some places, the water shoals suddenly from 15 to 10, 7, and 5 fathoms, there is no invisible danger, and when past Corregidor, the north shore has good anchorage over a sandy bottom. Farther to the northward and eastward this shore becomes more flat, the soundings decreasing regularly from 10 to 8, 6, 5, 4, and 3 fathoms close in shore.

Sir Edward Belcher remarks, that it is customary to enter this bay by the passage between Mariveles bay and Corregidor island, but experience has proved that this practice is injudicious, that the wider channel easterly, where less tide prevails, is to be preferred, where the local or coasting pilot well knows, that by hugging the eastern coast of the bay or wide channel, a fair leading or working breeze will be experienced at times when calms prevail on the western side of the bay. As an instance of this, at 5 h. 30 m. a.m. on the 16th March 1844, an American frigate was seen at dawn well to windward, taking the western channel. Fresh working breezes prevailed, and at noon the *Samarang* having beat up by the eastern channel, had brought El Frayle S.S.W.  $\frac{1}{2}$  W. and Cavite light-house E.N.E. In 12 hours, viz., at 5 h. 30 m. p.m. she was moored off Manila. At dawn the next morning the American frigate was seen becalmed on the west side of the bay, and she did not anchor off Manila before 8 o'clock.

The only reason advanced for the custom before alluded to, is, that it is more convenient for the guard boat to communicate by the western channel, and the officer of the guard boat generally instructs vessels in an authoritative manner to adhere to routine, even to threaten if his directions are not obeyed.

Working up on the eastern side of Manila bay, the chart furnishes sufficient warning as to where danger may be apprehended. The best leading mark for avoiding the San Nicholas banks (until Cavite lighthouse bears E. by N.  $\frac{1}{2}$  N.) is not to open El Frayle to the westward of the more distant land to the southward. Nevertheless, it is prudent to hug that shore, on short boards, up to that limit, particularly about noon, or before 2 h. p.m., as the south-east sea breeze first makes easterly, then southerly, off Cavite, which affords a fine lead to the anchorage off Manila.

**The COAST** from Los Cochinos, at the entrance of Manila bay trends in a general direction nearly N.W. by W.  $\frac{1}{2}$  W. for about 7 miles to Point Luzon, and is indented with several small bays; it then trends nearly north for about the same distance, and then north-westward for another 8 or 9 miles, thus forming a bight, named Bagac bay, the town of Bagac being in the depth of it, in lat.  $14^{\circ} 35' N.$  From the north-western extreme of this bay the coast line trends to the northward to port Subig.

From Los Cochinos to port Subig the coast is in general equally steep, and may be approached to one or 2 miles in some parts; but it will be prudent to give it a wide berth, as rocks or foul ground extend 2 miles or more from some of the points.

**Port Minangas, or Binanga,** is the first bight to the southward of the entrance of port Subig. Small vessels may anchor in 5 fathoms, sheltered from all winds excepting those at West and W.S.W.; the course into it is East and E. by N., about mid-channel between the points, to avoid the shoals projecting from them, and there are 4 fathoms, fine sandy bottom, inside, within a short distance of the shore.

**Port Subig** has Grande island at its entrance in lat.  $14^{\circ} 47' N.$ , long.  $120^{\circ} 12\frac{1}{2}' E.$ , to the westward of which is the safe passage into the port; for the passage to the eastward is intricate and lined by reefs. This port stretches 8 or 9 miles inland, and forms two excellent harbours, one on the east side, named port Olongapó, and the other at the northern extremity, opposite the village of Subig: here vessels may be sheltered from all winds in 7 to 10 fathoms, mud.

**Port Silanguin,** in lat.  $14^{\circ} 47\frac{1}{2}' N.$ , long.  $120^{\circ} 5' E.$ , is about half a mile wide at its entrance, and 2 miles deep, having tolerable shelter from all winds, except from N.W. and W.N.W. The southern point is formed by a high, round, bare island. The depth in the entrance of the port is

30 fathoms, decreasing gradually to the anchorage, a little inside, near the beach on the south shore, which is the best berth.

About a mile S.W. of the south entrance point of port Silanguin is a small island, named Los Friaes.

**Water.**—There is a stream of fresh water at the head of port Silanguin.

**Point Capones**, in lat.  $14^{\circ} 54' N.$ , long.  $120^{\circ} 3' E.$ , is the most western point of this part of Luzon, and therefore important to vessels proceeding to and from China, and passing close to this coast. It bears from Cabra, or Goat island, North, distant 60 miles, and is high, bare, land, of reddish aspect, having two islands about 2 miles distant to the north-westward of it; the outermost of these, Great Capones, is about one mile in length east and west, and nearly 3 miles distant from the shore.

About a mile outside point Capones the depth is 42 or 44 fathoms; from 40 to 35 fathoms will be found within a mile of the shore, between this part of the coast and the north point of port Subig, and generally 45 to 50 fathoms about 3 or 4 miles off.

**The COAST\*** from point Capones takes a general N. by W.  $\frac{1}{2}$  W. direction for 33 miles, to the southern part of Paulauig point. There is a town named Cabangan about 7 or 8 miles northward of point Capones, and another, and apparently more important town, named Iba or Yba, 6 or 7 miles southward of Paulauig point. A reef lies about 2 miles off shore, in lat.  $15^{\circ} 10' N.$ , with several other dangers between it and Paulauig point. Horsburgh, however, states that "19 or 20 miles to the northward of point Capones, is Playa-Honda, formed of a small hill, projecting a little into the sea; and the fort is 2 miles farther northward amongst trees, by which it is not easily perceived. The coast between them is of moderate height, with a level space of considerable extent northward of point Capones; but inland, the country is formed of high double mountains, one of which has a small sharp peak upon it. About 2 or 3 miles off, the depths are 35 and 40 fathoms, and the shore is lined by coral reefs, stretching out nearly a mile in some places; about  $1\frac{1}{2}$  miles from the beach there is a small coral bank, bearing S.W. by S. from Playa-Honda fort, having 2 fathoms water, and close to it 10 or 12 fathoms. From Manila bay entrance to lat.  $15^{\circ} N.$  the land is generally high and mountainous: here it begins to decrease in height; and near the sea to lat.  $16^{\circ} N.$  is not much elevated."

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\* See Admiralty charts:—China sea, Northern portion, No. 2,661; and Northern portion of Luzon, No. 2,454.

**Paulauig Point and Bank.**—The southern part of this point is in about lat.  $15^{\circ} 26\frac{1}{2}'$  N., long.  $119^{\circ} 53'$  E.; thence the coast trends northward for 5 or 6 miles to the southern point of entrance to port Masinloc.

Paulauig bank is a danger, about a mile to the south-westward of Paulauig point:\* and as there appear to be several other dangers on either side of the point, it will be prudent to give this part of the coast a berth of 3 or 4 miles.

**The COAST** from Paulauig point, to Caiman point bearing N. by W.  $\frac{1}{4}$  W. 30 miles from it, is indented with several deep bays filled with shoals, projecting beyond the points that form their entrance. Just round the northern part of Paulauig point, in about lat.  $15^{\circ} 31'$  N., is a small port named Masinloc; and 16 or 17 miles farther northward, inside the Hermana, or Sisters, islands, is the port of Santa Cruz:† between Santa Cruz and Caiman point is Bazol bay, which appears to be encumbered by many dangers.

**Hermana and Adder Islands.**—Hermana islands named by Horsburg the Two Sisters, are low and woody, with a conspicuous sandy beach, the northern one, in lat.  $15^{\circ} 48'$  N., being the larger, and distant about  $2\frac{1}{2}$  miles from the other.

Adder or Culebra island, about  $5\frac{1}{2}$  miles northward of the North Sister, is small, with trees on it and a sandy beach.

These islands have shoals projecting a long distance from them, and it, will be prudent to give them a good berth in passing, for they are about 6 miles off shore.‡

**Caiman Point**, in lat.  $15^{\circ} 55\frac{1}{2}'$  N., has a reef projecting to the S.S.W.; but the channel is safe between it and Culebra island, having 60 fathoms water.

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\* The *Luzon*, a new steamer, commanded by Mr. McGowan, was wrecked upon this shoal in December 1864 (see Straits Times, February 4th, 1865), but no account of its exact position has reached us.

† Masinloc of the present charts is named Pulanguian by Horsburgh. The same authority calls Santa Cruz, Santa Cruz or Matsinglo, and remarks upon those ports as follows:—Matsinglo point, to the south-east of the Two Sisters, is united to the southernmost by a reef, having inside to the eastward the bay and town of Santa Cruz, or Matsinglo, which is frequented by coasting vessels, and said to afford tolerable shelter. The channel leading to it is on the north side of the northern isle, but narrow and intricate, being bounded by coral shoals, with no ground 60 fathoms a little outside the entrance. To the southward of Matsinglo point is Masinloc bay, fronted by two islands; and Pulanguian bay, a little farther southward, has also an island off its south point.

‡ Horsburgh remarks, that “the ship *Sir Edward Pellew* bound to China, in October 1806, ran upon the reef contiguous to the Two Sisters in the night, and was got off with difficulty. Passing them about 2 or  $2\frac{1}{2}$  leagues off in the *Anna*, we could not at that distance, perceive the dangers.

**Tambove Road.\***—The channel between Culebra island and Caiman point leads to Tambove road, which lies to the eastward of Caiman point, and is open only to southerly winds. Steering for the extremity of the beach, to the eastward of the point, the depths will be 12 to 15 fathoms, coarse sand and shells, near the termination of the beach; the water will then deepen, but until in soft mud it will be improper to anchor, for rocks are scattered over the bottom, where it consists of sand.

Wood and good water may be obtained here.

**The COAST** from Caiman point nearly to Piedra point, is level, of moderate height and sterile aspect, with a steep beach fronting the sea, and may be seen in clear weather about 24 miles. This part of the coast is bold to approach, having no bottom at 50 fathoms within a mile of it in many places; there are soundings near the beach in some of the small bays, where a small vessel might anchor occasionally, but there is no safe place of shelter for large vessels.

Piedra point (cape Bolinao of the old charts) is described by Horsburgh as point Arenas, cape Bolinao, according to that authority, being the north-eastern extreme of an island named Santiago island, separated by a narrow channel from the main.† Between Piedra point and the island the coast is described as level land, covered with trees, the bays between the points being full of shoals. Santiago island is described by the same authority as low, even land, covered with trees, and sloping gradually to the extremity, where it has a small rise and terminates in a bluff point, not discernible above 18 or 19 miles from the deck of a large vessel.

As the coast of Santiago island and also the islets which lie off it is fronted by shoals projecting about  $2\frac{1}{2}$  miles, vessels ought to give the north side of the island a good berth in the north-east monsoon, for a southerly current may be liable at times to drift them into Lingayen gulf, or near the shoals on its western side.

**LINGAYEN GULF**, or Pangasinan gulf, to the eastward of Santiago island, is formed by the low land from that island, lying a southeasterly direction about 12 miles; and then the Mongos-Mongos chain of islets and rocks, extending along it nearly S.E. by S., lines the west side of the bay.

The gulf is about 30 miles deep, and about 20 miles wide across the entrance, from Santiago island to San Fernando point, or Balanac. Lingayen river, a place of some trade, disembogues at the bottom of the

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\* Horsburgh.

† Were it not for the shoals fronting this channel and stretching nearly a league from the cape all round, shelter would be found inside from all winds; but the approach to it is dangerous, as a vessel may get entangled by the shoals before the entrance of this intricate port is discerned.—*Horsburgh*.

bay, and into which the small coasting vessels can pass over the bar. The rivers San Fabian and San Thomas are farther eastward, the former directly in the south-east angle of the bay.

**Port Sual**, situated 2 miles to the southward of the high islet Cabalitian, which is the southernmost of the Mongos-Mongos chain, has good anchorage, muddy bottom, at its entrance; a vessel might be warped into the port, should circumstances render it necessary.

The port is little over a mile long north and south, and nearly a mile broad, with depths of 4 to 8 fathoms; the entrance, however, is narrowed by rocks and reefs to the breadth of about 2 cables, while an extensive coral bank, with 6 to 18 feet water over it, fills up a large portion of the port. The eastern edge of this bank is marked by three beacons.

The land about Portuguese point, the northern point of entrance of the port, appears like an island when viewed from a distance of 7 or 8 miles; the point may be recognized by a small round tower on its bluff, and between it and Cabalitian island the ground is foul, with rocks just awash. A reef extends 2 cables from Portuguese point; it is always covered, and the sea breaks upon it only when the wind sets in. There is a beacon near the south edge of this reef. Mangas point, the southern point of entrance, has rocks extending nearly 3 cables from it; but they are always uncovered, and may be approached to half a cable. In the south-west part of the port is the village, which has a church and a small landing jetty.

**Supplies.**—Coals are brought from Lyngayan to Sual at 18 dollars the ton. Water can be procured from a stream in south-west part of the port.

**Directions.**—When approaching the port, keep about  $1\frac{1}{2}$  or 2 miles from Cabalitian island, steering for Mangas point; pass the outer rock off that point at the distance of half a cable, and then steer for the church taking care to avoid the large coral patch, the southern edge of which lies between the north-east point of the port and the church, anchor in 5 or  $4\frac{1}{2}$  fathoms.

**Tides.**—Springs rise 6 feet.

**Adela Rock**, with 12 feet water, and 6 fathoms close around, lies half a mile east of Mangas point. This rock is marked by a beacon.

**POINT DILE**, in lat.  $17^{\circ} 34\frac{1}{2}'$  N., long.  $120^{\circ} 20\frac{1}{2}'$  E., is the most prominent point of this part of the coast, projecting far to the north-westward. Between it and San Fernando point there are several towns along the coast, which is bold to approach; the country is formed of high double mountains, with low woody points to seaward in some places, and the direction of the coast is mostly North and N. by E.

**Vigan or Bigan Road**, in lat.  $17^{\circ} 32' N.$ , is sheltered from northerly winds by Dile point, but exposed to the southward and westward. A patch of  $3\frac{1}{4}$  fathoms lies about a mile off shore. The anchorage is in 10 or 12 fathoms, near the shore, with the river bearing about East; the bank shelves suddenly. About 9 miles inland to the E.N.E. of the road there is a chasm between two mountains, named Abra de Vigan, or gap of Vigan, which is very conspicuous when viewed from the offing, and is a good mark to know this part of the coast.

**Lapug Bay** (Salut-Sulut bay of the old charts, and Solón-Solon bay of Horsburgh), at 11 miles north-eastward of Dile point, is sheltered from all winds but those that blow between S.W. and W.N.W.; there are good depths in it, and the reefs bounding the entrance, with a rocky bank in the mouth of the bay, will be seen in clear weather. The rocky bank has one and 2 fathoms on it, with a passage on each side of 9 or 10 fathoms water; but that to the northward, between it and the north point of the bay, is too contracted.

The coast from Vigan road to this bay should be given a good berth, for Pinget island, or Bantay, surrounded by breakers and foul ground, lies about  $1\frac{1}{2}$  miles off the projecting part of the land to the southward of Lapug bay; and to the northward of it the coast is lined with coral reefs, stretching out a great way, as far as the entrance of Lapug bay.

**Port Salomague**, adjoining to the northward of Lapug bay, is separated from it by a point of land encompassed with shoals. West from this point,  $1\frac{1}{2}$  and 2 miles distant, are two rocky banks, with  $2\frac{1}{2}$  fathoms, or probably less, water on them. This port is more capacious, sheltered from the same winds and deeper than Lapug bay.

The north point is also, like the southern one, encompassed with a reef, which stretches to the eastward along the northern side of the port; and an island of moderate height lies about three-quarters of a mile from the point, with a reef projecting off it about a cable to the south-west. This place may be known from the offing by a chasm or gap in some high mountains, which overtop the rest of the chain on this coast: it resembles the gap of Vigan, but it is not so large, nor does it approach so near the sea as that gap; it may also be seen bearing about S.E., when a vessel is 12 or 13 miles west of Salomague bay. When the gap of Salomague bears about E.  $\frac{1}{4}$  S., an East course will lead direct towards Salomague island at the north point of the port, which should be approached in a large vessel bearing about East; and the reef off its south-west point ought to be passed close in 25 or 30 fathoms, mud, to avoid the rocky banks that lie to the westward of the south point of the port; she may then steer for the middle of the port, rather inclining towards the northern shore, and anchor in 8 fathoms. Farther in there is a shoal spot, which will be



perceived in clear weather by the discoloured water on it. The best berth to moor is in 6 or 7 fathoms, mud, opposite some rice magazines on the north shore.

**The COAST** from port Salomague trends about N. by E. to cape Bojeador; in the bight to the southward of the cape there is said to be anchorage near the shore; in some parts the coast is low and woody to seaward.

The chain of high mountains inland, which commences near St. Fabian in the gulf of Lingayen, extends parallel to the coast, gradually diminishing in height, and stretching more inland about 24 miles to the southward of cape Bojeador, leaves a spacious plain fronting the sea. Another chain of hills begins about 7 or 8 miles from the shore, and stretches northward parallel to the coast-line.

About 9 miles northward of Salomague and three-quarters of a mile from the shore lies Badog or Sinay isle, surrounded by a reef; the intervening coast is rocky, with breakers projecting from it about a mile.

Ilara hummock situated near the sea, about 9 miles southward of cape Bojeador, is of moderate height, with patches of trees on it, and there being no other of similar appearance, it is a good mark in sailing along the coast. Soundings may be obtained about three miles from the shore between Salomague and Ilara hummock, but from 4 or 5 miles beyond the latter to cape Bojeador, none are obtained at the distance of 2 miles from the shore; and the whole of this part of the coast is destitute of shelter for vessels, and has rocky patches stretching out above a mile in some parts.

**CAPE BOJEADOR**, in lat.  $18^{\circ} 30' N.$ , long.  $120^{\circ} 34' E.$ , is a low point with a reef of breakers projecting from it, which forms the north-western extreme of Luzon. Thence the coast trends in a north-east direction, 6 miles to point Negra, on the east side of which anchorage may be obtained during southerly winds. The deep bay between this point and Dialao point, 9 miles to the north-east, has much foul ground on its eastern shore. There is anchorage at the head of this bay, near the small port of Bangui, which is said to have been long shut up by an earthquake.

Mayraira or Cavndian point, distant about 20 miles north-east of cape Bojeador, has a reef projecting about a mile out. Point Cabicungan, bearing about E. by S. 13 miles from Mayraira point, is a bluff steep point of white cliffs, having a mass of high mountains, the Montes Patapa, contiguous to it. To the eastward of point Cabicungan there is a round hill of middling height, named point Pata. The whole of the coast from cape Bojeador to this place is steep, without any soundings until near the shore; the land is of moderate height, and in some parts rather low close to the sea, with several rivers; but the country inland is high and mountainous.

**SCARBOROUGH or MAROONA SHOAL\*** is a dangerous coral reef rising out of deep water, and it affords, and that only in the calmest weather, a single precarious anchorage off the entrance to the lagoon, at its south-eastern extremity. The opening to the lagoon is about 2 cables wide, but it is dangerous from the large jutting pieces of coral extending from point to point, over which there are only 9 feet water, with 5 and 6 fathoms close to; just within it shallows.

The reef consists of a narrow belt of coral, nearly level with the water's edge, enclosing a lagoon of clear blue water. On the belt are scattered several rocks 3 to 10 feet above water, visible about 5 miles. The 10-foot rock is  $1\frac{1}{2}$  miles S.W. of the opening. In shape the reef is a right angled triangle with the corners rounded off, the western side being nearly perpendicular to the southern, the direction of the three sides being S.  $\frac{3}{4}$  E.  $7\frac{1}{2}$  miles, S.E. by E. 10 miles, and E.  $\frac{1}{2}$  N. 8 miles. The south side and north point are in lat.  $15^{\circ} 5' N.$  and  $15^{\circ} 12' N.$  respectively, and the west side and east point in long.  $117^{\circ} 44'$  and  $117^{\circ} 52' E.$

In March 1866 the current ran strong to the westward; in April 1853 its direction was very doubtful in the proximity of the reef.

**Tides.**—It is high water, full and change, on Scarborough shoal, about 8 p.m.; springs rise 5 feet.

**The TRURO SHOAL**, in lat.  $16^{\circ} 19' N.$ , long.  $116^{\circ} 41' E.$ , was discovered by Capt. T. J. Duggan, of the Ship *Truro*, in September, 1857. He states, "Whilst taking my forenoon observation, distinctly saw the bottom, white coral. Got a cast of the lead instantly at 10 fathoms; again, about half a mile more north, had 19 fathoms; steered north for another half mile, and had 22 fathoms, and the next cast no bottom at 40 fathoms; no shoal patches were visible from the mast-head."

**PRATAS ISLAND and REEF.**†—Pratas island, the north-east end of which is in lat.  $20^{\circ} 42' 3'' N.$ , long.  $116^{\circ} 43' 22'' E.$ , rises from the west side, and near the middle of the sunken part of the Pratas reef. It is about  $1\frac{1}{2}$  miles long, E. by S. and W. by N., half a mile wide, and 40 feet high, of which elevation the scrubby bush, with which it is covered, forms about 10 feet. It is composed of sand, not a particle of mould or earthy matter could be found on it, and its shape is that of a horse-shoe, enclosing a shallow inlet or lagoon, which runs into its western side for about half a mile, and must afford shelter to the Chinese fishermen who come here to fish in the early part of the year. Brackish water can be

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\* The description of the Scarborough shoal is by Mr. Wilds, Master, commanding H.M. surveying vessel *Swallow*, who surveyed it and determined its position in March 1866.

† Surveyed by Mr. John Richards, Master, R.N., April 1858.

obtained by digging a few feet into the sand. Gannets are numerous, and may be knocked down with sticks.

The island is visible at a distance of 9 or 10 miles, in clear weather from the deck of a large vessel; from the westward it will make like two detached but contiguous islets, the centre being lower than the ends. It is visible when near the southern extreme of the reef, but more conspicuous when approaching it from the westward or northward.

Pratas reef, the north-east point of which is in about lat.  $20^{\circ} 47' N.$ , long.  $116^{\circ} 53' E.$ , is a coral barrier of nearly circular form, encircling a lagoon of 5 to 10 fathoms water, and thickly studded with coral knolls round its margin, but comparatively clear near the middle. The reef is about 40 miles in circumference, one to 2 miles broad, and slightly flattened on the northern side. Nearly two-thirds of it, or the north, east, and south sides, are just dry at low-water springs; the remainder, or western side, forms a sunken barrier, across which are two channels leading into the lagoon, one on each side of Pratas island. The north channel is about 3 miles wide, between the island and the edge of the breakers, and 3 fathoms may be carried near the middle of it at low-water springs. The south channel is by far the better of the two, from being wider, a little deeper, as well as its comparative freedom from coral knolls.

#### **Light proposed.**

**Tides.**—During the survey of Pratas reef, April 1858, it was high water, full and change, at about 4 h.; springs rise about 5 feet. There was only one perceptible ebb and one flow in the 24 hours at the springs. The highest tide occurred on the third day after the full moon, but the tides were very irregular.

**Anchorage.**—Although Pratas reef is steep-to in most parts, there are several spots where, in case of necessity, a vessel might find anchorage outside the breakers, particularly on the west side, abreast the middle of the channels through the sunken part of the reef, and at the distance of about  $1\frac{1}{2}$  or 2 miles on either side of the island. At each of these spots there is good anchorage in the north-east monsoon, in 20 to 10 fathoms, but the position abreast the south channel is considered the best, the sunken reef at this part being deeper and the bottom more even than in the channel north of the island. A vessel of light draught might even anchor in safety on the reef, in the middle of the south channel in  $3\frac{1}{2}$  fathoms at low water, or cross it and take up a berth inside the lagoon in 10 fathoms, fine sand.

Captain Ross, I.N., visited this reef in the *Discovery*, with the *Investigator* in company, August 1813. The first soundings obtained were 74 fathoms, fine coral, about  $1\frac{1}{2}$  or 2 miles from the north-east

point; from thence the former vessel steered along the north side, about three-quarters of a mile from the breakers, in soundings of 31 to 38 fathoms; the *Investigator* keeping about a quarter of a mile off, had great overfalls of 10 to 24 fathoms. After rounding the north-west part of the reef about a mile off in 35 fathoms, rocky bottom, they anchored in 24 fathoms, about  $1\frac{1}{2}$  miles from the west end of the island, with the island bearing from S.E.  $\frac{1}{2}$  S. to E.S.E. About half-way between this position and the shore the depths were 4 and 5 fathoms, and then very shoal water.

H.M.S. *Highflyer*, in May 1857, anchored about 8 cables from the west end of the island, in 20 fathoms, coral and clay, the extremes bearing S.E.  $\frac{2}{3}$  E. and E. by S. She also anchored, with stream anchor, at half a mile from the south-east edge of the reef, in 32 fathoms, white mud, with the centre of the island N.W.  $\frac{1}{2}$  W. distant 10 miles; there were 13 fathoms water at 2 cables from the edge of the reef, and 7 fathoms at a short distance from the edge. In April 1869 H.M. steam gunboat *Leven* anchored three-quarters of a mile off shore in 5 fathoms, with the centre of the island bearing E. by N.

**CAUTION.**—During the strength of the monsoons, vessels should always endeavour to pass to leeward of Patras reef on account of the invariable set of the current to leeward; for there are no soundings to indicate a near approach, and the weather is frequently thick and hazy in this vicinity. The safest quarter to make the reef is from the north-west, the island being on its western side, and the currents in the neighbourhood invariably running in a N.E. or S.W. direction according to the monsoon. Approaching the reef a vessel should be conned from the fore-top. The sun should be well above the horizon, and if possible astern or on the beam. as the bottom can then be easily seen in 10 fathoms.

**The HOSSACK SHOALS** were said to have been seen by Mr. Hossack, commanding the ship *Cyclone*, 9th August 1861. He reports, "When standing to the N.W., wind W.S.W., tacked ship, having seen two patches, the easternmost of which appeared to be very shoal, about 2 or 3 fathoms water, extending about 400 feet, and the water breaking on it. From good observations the position of the reef is lat.  $21^{\circ} 31' N.$ , long.  $117^{\circ} 7' E.$ " These shoals were sought for in vain by H.M.S. *Serpent* in 1866.

## CHAPTER XIII.

## PALAWAN PASSAGE AND APPROACHES.

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VARIATION  $1^{\circ} 30'$  East in 1879.

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**SOUTH LUCONIA SHOALS**\* comprise a group of four coral shoals, the southernmost of which is about a mile in extent, and in the form of a horse-shoe, with the open part to the north-eastward; between the horns of the shoal are 26 fathoms. The general depths on the shoal are from 2 to 3 fathoms, but near the north-west extreme is a rock nearly awash. The southern extreme of the middle part of the shoal is in lat.  $4^{\circ} 59\frac{1}{2}'$  N., long.  $112^{\circ} 39\frac{1}{4}'$  E., and bears from Barram point W. by N.  $\frac{1}{4}$  N., distant 81 miles.

The westernmost shoal of the group, lying about W. by N., distant 7 miles from the southernmost one, is nearly 2 miles long N.W. and S.E., and about three-quarters of a mile broad. The general depths over it are 2 and 3 fathoms, but near the south-east extreme is a rock just below the surface of the water, and a similar one at the north-west extreme; the latter is in lat.  $5^{\circ} 2\frac{1}{4}'$  N., long.  $112^{\circ} 31\frac{1}{4}'$  E.

**Luconia Breakers.**—A reef, nearly half a mile in extent, and upon which the sea breaks even in fine weather, lies on the eastern extreme of a shoal, over which are various depths under 5 fathoms. The shoal extends nearly 2 miles in a north-westerly, and about a mile in a south-westerly direction from the centre of the breakers, which is in lat.  $5^{\circ} 3' 24''$  N., long.  $112^{\circ} 41' 36''$  E.

One mile north-eastward of the centre of the breakers is the south extreme of a narrow strip of shoal, with 2 to 3 fathoms water over it which extends from thence about N. by E. for a distance of 2 miles. The north extreme of this shoal is in lat.  $5^{\circ} 5\frac{3}{4}'$  N., long.  $112^{\circ} 42\frac{3}{4}'$  E.

The whole of these shoals are steep-to.

There is good reason to believe that no dangers exist between the South Luconia shoals and the coast of Borneo.† Many lines of soundings were

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\* See Admiralty charts :—China Sea, general, No. 1,270; scale, degree =  $0.9$  of an inch : China sea, southern portion, Nos. 2,660, *a* and *b*; scale,  $m = 0.05$  of an inch; Palawan island, No. 967; scale,  $m = 0.1$  of an inch.

† The *Rifleman* steamed for three days over and about the reputed positions of two very doubtful dangers, named, on the old charts of Horsburgh, Kirton shoal and Euphrates reef. The weather and other circumstances were extremely favourable for seeing shoal patches, but nothing was visible, nor could bottom with 600 fathoms be obtained on the position ascribed to the Euphrates reef.

obtained in the *Rifleman* from those shoals in directions between S.W. (round southward) and East, but no dangers could be discovered: the general depths were from 55 to 69 fathoms.

**NORTH LUCONIA SHOALS.**—Upon the old charts of the China sea a number of dangers were shown between the parallels of  $5^{\circ} 20'$ , and  $6^{\circ} 2'$  N., and the meridians of  $112^{\circ} 14'$  and  $112^{\circ} 40'$  E.; they were named Luconia, Seahorse, George and Abercrombie, and Friendship shoals. These dangers were examined by the *Rifleman*, and were found to consist of a mass of coral reefs and shoals amongst which no vessel should venture. The above general name is now adopted as applying to the entire group, but the names given by the original discoverers have been retained for particular or conspicuous localities.

The southern extreme of the group is marked by two shoal patches, about 4 miles apart, but lying in the same latitude,  $5^{\circ} 27\frac{1}{4}'$  N., and each of them is rendered conspicuous by rocks just below the surface of the water, upon which the sea breaks with the least swell.

The western patch, about a mile in extent East and West, and a quarter of a mile wide, has but 6 to 12 feet water over it, and near its western end in long.  $112^{\circ} 32\frac{1}{2}'$  E., are two rocks nearly awash, upon which the sea is generally breaking even in fine weather. About half a mile west of these rocks is a patch of 3 fathoms, on the eastern extreme of a coral bank, with 12 feet least water, which extends thence—curving gradually to the north-westward—for a distance of 3 miles.

The eastern patch has, like the western patch just described, two rocks nearly awash at its western extreme, in long.  $112^{\circ} 38'$  E., and upon which also the sea is generally breaking even in fine weather. The shoal patch upon which they lie has 12 feet water over it, and, about a mile eastward of the rocks, it forms the south-eastern extreme of a long narrow coral bank, which extends from thence  $6\frac{1}{2}$  miles, in a general direction about N.N.W., its average breadth being about a third of a mile. The general depths over this bank are 4 or 5 fathoms, but there are several patches of 2 and 3 fathoms, and a rather extensive patch near its north-western extreme, in lat.  $5^{\circ} 32\frac{3}{4}'$  N., long.  $112^{\circ} 35\frac{1}{4}'$  E., has as little as 9 feet over it.

**Seahorse Breakers**, in lat.  $5^{\circ} 31'$  N., long.  $112^{\circ} 34'$  E., the most conspicuous danger of the Luconia shoals, consists of a reef of rocks and sand just above water, about a mile long, N. by E. and S. by W., and one-third of a mile broad. From these breakers, shoals extended as far as the *Rifleman* was able to sound in 1863, viz., 18 miles North, 5 miles South, 5 miles East, and 13 miles West.

The northernmost of the shoal patches reached in 1863 was in lat.  $5^{\circ} 48' 30''$  N., long.  $112^{\circ} 32' 15''$  E. In 1866 the vessel was anchored near a  $2\frac{3}{4}$  fathoms patch, in lat.  $5^{\circ} 55' 15''$  N., long.  $112^{\circ} 31' 30''$  E., on

the northern edge of a coral bank, traced for 2 miles to the southward, but which no doubt extends to the northernmost patch surveyed in 1863, and just referred to; vessels should not pass between these positions.\*

**Friendship Shoal** is the northernmost of the Luconia group; the *Rifleman* crossed it without getting less than  $4\frac{1}{2}$  fathoms, although there appeared to be less depths in some places. The north part of the shoal is in lat.  $5^{\circ} 59' 30''$  N., long.  $112^{\circ} 31' 30''$  E., and though this position must be considered approximate, it is nevertheless near the truth. Lines of soundings were obtained in directions N.E., North and N.W. from the north end of the shoal for a distance of 4 miles, but no shoal water was found.†

**CAUTION.**—No directions can be given that will enable vessels to pass safely though these reefs and shoals. Although not less than 12 feet were found upon those to the northward of the Seahorse breakers, yet they should be avoided, as it is quite possible there may be knolls with less water upon which have escaped the lead.‡

**VERNON BANK**, discovered by H.M.S. *Vernon* in 1847, is a large coral shoal, having a dangerous group of rocks, named after H.M.S. *Fury*, upon one part, and a patch of  $2\frac{3}{4}$  fathoms on another part of it. The bank lies between the parallels of  $5^{\circ} 39'$  and  $5^{\circ} 50\frac{1}{4}'$  N., and the meridians of  $114^{\circ} 57\frac{1}{2}'$  and  $115^{\circ} 7\frac{1}{2}'$  E., and is in form of an irregular triangle, having its base, 6 miles in length, to the south-west, and its apex to the north-east, extending in those directions about 12 miles.

The *Fury*, in 1858, crossed the western edge of this bank, and saw breakers about  $1\frac{1}{2}$  miles in extent, which no doubt were on the *Fury* rocks. This formidable danger is nearly 3 miles in extent, and consists of coral patches with 2 to 3 fathoms water over them, and several detached

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\* Captain Bate in H.M. ship *Royalist* passed over the position ascribed to the George and Abercrombie without finding it. He supposed that it and the Friendship were the same shoal; but the error was in the longitude of the George and Abercrombie, which placed it too far to the westward. It exists, and forms part of the mass of shoals which extend continuously from the Seahorse breakers to the Friendship.

† The survey of the Luconia shoals is not (October 1867) completed to the northward and westward.

‡ Captain Bate also passed over the position assigned by Horsburgh, viz., lat.  $5^{\circ} 54'$  N., long.  $114^{\circ} 7'$  E., to the Cayo Marino, a 3-fathoms shoal, without being able to discover it; nor could soundings be obtained, when in the neighbourhood, with from 180 to 200 fathoms.

The Cava shoal, placed by Horsburgh in lat.  $5^{\circ} 51'$  N., long.  $114^{\circ} 30\frac{3}{4}'$  E., was searched for in vain by the *Rifleman*; on the spot mud bottom was obtained with 415 fathoms of line. She also anchored in 46 fathoms on the supposed position of a reef, on which the steamer *South-western* is said to have struck, in lat.  $5^{\circ} 54'$  N., long.  $115^{\circ} 4\frac{1}{2}'$  E., and sounded round it for miles, obtaining regular soundings. Commander Ward confidently asserts that the reef does not exist.

rocks, one or two of which nearly uncover at low water. These rocks are pinnacle shaped with 4 to 6 fathoms around them, so that in fine weather there is seldom much break of the sea over them, and sometimes none at all probably. The centre of the rocks is in lat.  $5^{\circ} 43\frac{1}{2}'$  N., long.  $115^{\circ} 2\frac{1}{4}'$  E., and with the eye 18 feet above the sea, the highest part of Labuan (460 feet) is just visible, bearing S.S.E.  $\frac{3}{4}$  E.

The soundings on the other parts of the bank are irregular, with several patches of but 4 and 5 fathoms, and on the west and north-west sides of the bank is a sort of curved coral wall, convex to seaward, having  $4\frac{1}{2}$  to 9 fathoms on it, 14 to 19 fathoms inside of it, and 20 to 30 fathoms close to outside of it. As the Fury rocks lie 2 to 3 miles inside the edge of the bank, the lead, if carefully attended to, will give sufficient warning to avoid them; but large vessels should on no account make free with this dangerous bank, and small vessels will do well to give it a wide berth, for the currents in the vicinity are very uncertain.

The  $2\frac{3}{4}$  fathoms patch, near the north-east extreme of the bank, is in lat.  $5^{\circ} 49' 20''$  N., long.  $115^{\circ} 5' 20''$ . It is a small coral knoll, surrounded to some distance by soundings of 4 and 5 fathoms. This part of the bank should also be avoided.

**SAMARANG BANK**, its centre in lat.  $5^{\circ} 35\frac{1}{4}'$  N., long.  $114^{\circ} 53\frac{3}{4}'$  E. is an oval-shaped coral bank  $6\frac{1}{2}$  miles long, E. by N. and W. by S., and  $4\frac{1}{4}$  miles broad. The general depths on it are 4 to 6 fathoms, and the least water found was  $3\frac{1}{2}$  fathoms. From the centre of the bank the highest part of Labuan bears S.E. by E.  $\frac{1}{4}$  E.

**SARACEN BANK**.—H.M. surveying vessel *Saracen* in 1854, on her passage from Labuan to Hong Kong, discovered an extensive coral bank, having generally from 2 to 4 fathoms water over it, with dry patches and several coral knolls with but a few feet water over them. The bank is 5 or 6 miles in diameter, and its centre is in about lat.  $6^{\circ} 7\frac{1}{2}'$  N., long.  $115^{\circ} 20\frac{1}{2}'$  E., bearing W. by S.  $\frac{1}{2}$  S., distant 14 or 15 miles from Mangalum island (page 131).

Dangers had been seen in this locality before, but their positions were uncertain. It seems probable that other dangers may exist hereabouts besides those known.

**LOUISA REEF**, the south-west rock of which is in lat.  $6^{\circ} 19\frac{3}{4}'$  N., long.  $113^{\circ} 18\frac{1}{2}'$  E., or  $9^{\circ} 27' 12''$  east of Fullerton battery, Singapore, by the *Royalist* in October, 1851, is a dangerous coral reef of quadrangular form, two-thirds of a mile in extent from east to west. The rocks on it are generally covered at high water, with the exception of two small clusters on its eastern and south-western extremes; the centre of the shoal is shallow. There are no soundings with 50 fathoms close to its outer edge, nor with 180 fathoms a quarter of a mile to the south-



westward of the shoal, but within 20 yards of the south-west rock there are 10 fathoms.

**The Tidal Stream** at the Louisa shoal at noon, on the full and change days in the month of October 1850, was setting to the W.N.W., and the maximum rise appeared to be about 4 feet.

**ROYAL CHARLOTTE REEF**, of a nearly rectangular shape, is  $1\frac{1}{2}$  miles in length, N.W. by W., and S.E. by E., and nearly a mile in breadth. On its south-eastern side are stones 2 to 4 feet above high water; the highest of them is in  $6^{\circ} 57' 18''$  N., and  $113^{\circ} 35' 30''$  E.; there are also one or two stones on its north-east edge which just show at high water.

**SWALLOW REEF**, formed of a belt of coral surrounding a shallow basin of water, is  $3\frac{1}{2}$  miles long, E.  $\frac{3}{8}$  N., and W.  $\frac{3}{8}$  S., and  $1\frac{1}{2}$  miles wide. At its eastern part are some rocks from 5 to 10 feet above high water, the highest of which is in  $7^{\circ} 23' 18''$  N.,  $113^{\circ} 50' 23''$  E.; there are also one or two stones on the south-eastern side which show at high water; the west end terminates in a sharp point.

**ARDASIER BANK**, which is very extensive, has only received a partial examination; it is probable that the South Ardasier, Gloucester, and North Ardasier breakers, as also the breakers seen by Mr. Dallas in 1860, are shoal patches on different parts of one large bank. The south-eastern side, which forms one of the northern limits of the approach to the Palawan passage, has been surveyed in the *Rifleman*; the general direction of this part is N.E. by E.  $\frac{1}{2}$  E. and S.W. by W.  $\frac{1}{2}$  W. for a distance of 20 miles, but the outline of the edge is very irregular. Several shoal patches of 3 to 5 fathoms were found near the edge; the shoalest spot discovered had only  $2\frac{1}{4}$  fathoms water, and is in  $7^{\circ} 36' 37''$  N.,  $114^{\circ} 10' 10''$  E., near the position ascribed to South Ardasier breakers.

**Viper Shoal**, the existence of which is doubtful, is said to lie in lat.  $7^{\circ} 30'$  N., long.  $115^{\circ}$  E. The *Royalist* passed over its assigned position, and when on the spot could get no bottom with 500 fathoms, though the day was clear, and conditions good for detecting a danger. The *Saracen* subsequently passed over the same ground with a view to its discovery, and with the same result.

**NORTH VIPER SHOAL**, or Seahorse, is shown on the chart as a shoal with rocks above water, 5 miles in extent, lying between the parallels of  $7^{\circ} 59'$  and  $8^{\circ} 4'$  N., and in long.  $115^{\circ} 23'$  E. The position of this reputed shoal was not examined by the *Rifleman*. The *Saracen* passed near it without seeing any appearance of shoal water, but from the following account of a reef seen by Mr. Baird, this danger would appear to lie 17 miles N.  $\frac{1}{2}$  E. of its ascribed position on the chart.

**COMMODORE REEF.**—Mr. Hugh Baird, commanding the ship *Commodore*, reports as follows :—Monday, 22nd December 1862, at 8 a.m., saw what I took to be the North Viper shoal, or Seahorse, the north-east end bearing by compass N.N.W. 3 miles; it seemed to extend over 3 miles N.E. and S.W. Partly dry sand, and several rocks from 20 to 30 feet above water, and heavy breakers all around it. At noon it bore W. by S., distant about six miles; lat. by observation  $8^{\circ} 22' N.$ , long.  $115^{\circ} 31' E.$ \*

**CAUTION.**—A glance at the chart will show that the whole of that part of the China sea extending from the Vernon bank north-westward of Labuan, in a line passing over the Saracen bank and Mangalum island to the Furious shoals, pages 131, 139, and 278, should, until closely surveyed, be navigated with the greatest possible caution. Vessels proceeding to China by the Palawan passage should not venture amongst the shoals near Labuan and Mangalum island, but keep to the northward of them, and closer to the track recommended on the chart.

#### DANGERS ON THE WESTERN SIDE.

**HALF-MOON SHOAL,**† having the Inclined rock on its eastern side in lat.  $8^{\circ} 51\frac{1}{4}' N.$ , long.  $116^{\circ} 16' 45'' E.$ , by H.M.S. *Royalist* in July 1853, is formed by a belt of coral even with the water's edge, of the average width of one cable, except at its south-west extremity, where it is broader. It is of oblong shape, nearly 3 miles long, in a north-east and south-west direction, with an average width of one mile. On the eastern side, southward of the Inclined rock, there are two breaks in the belt forming channels into the basin, the southernmost of which has 4 to 9 fathoms in it, and is marked by a cluster of rocks, which generally show above water. Half-tide rocks are interspersed over the belt, the largest of which is at the north-west extremity of the shoal. The average depth in the basin is 14 and 16 fathoms, with numerous patches of coral scattered about it. From the shoal Bálabac peak (page 159) bears S.E.  $\frac{1}{2} S.$ , distant 71 miles; Bulanhow mountain (page 181) E. by S.  $\frac{1}{4} S.$ ; and the Elbow or nearest part of the bank of soundings fronting Palawan island (page 282), S.E.  $\frac{1}{2} E.$ , 39 miles.

**Tides.**—It is high water, five days after full and change, at the Half-Moon shoal at 10h. 45m. a.m., and the rise is about 4 feet.

**ROYAL CAPTAIN SHOAL** lies E.N.E.  $23\frac{1}{2}$  miles from the Half-Moon shoal, and N.W.  $\frac{1}{3} W.$  from the edge or nearest part of the

\* Mer. Mag., 1863, p. 125.

† See Admiralty chart:—Palawan island, No. 967; scale,  $m=0.1$  of an inch.

bank, contracting the channel, which is here the narrowest part, to  $25\frac{1}{2}$  miles in width;\* Observation rock, at its north extremity, which shows at half tide, is in lat.  $9^{\circ} 1' 45''$  N., long.  $116^{\circ} 39' 36''$  E., and from it Balábac peak bears S. by E.  $\frac{3}{4}$  E., distant  $68\frac{1}{2}$  miles, and Bulanhow mountain S.E. by E.  $\frac{1}{2}$  E. This shoal is elliptical, the length being  $1\frac{3}{4}$  miles in a north-west and south-east direction, with a breadth of one mile. The belt, which is entirely covered at high water, and of irregular form in the inner rim, varies very much in width, the broadest part being at the south-east extremity, where it is 2 cables. There are depths of 15 to 17 fathoms, sand and coral, with several coral patches, inside the basin. There is no entrance, but at high water a boat can cross the belt. The outer edge is steep-to, having no bottom, with upwards of 100 fathoms within half a cable of the reef. Only a few rocks on the belt show at low water.

**Tides.**—It is high water 6 days after full and change, at the Royal Captain shoal at 11.30 a.m.; the rise is about 4 feet.

**BOMBAY SHOAL**, on which the French frigate *Madagascar* was wrecked in 1841, lies N.E. by N. 29 miles from the Royal Captain shoal, and  $27\frac{1}{4}$  miles from the nearest part of the bank of soundings. Madagascar rock on its north-east extremity, is in lat.  $9^{\circ} 26' 7''$  N., long.  $116^{\circ} 56' 4''$  E., and from it Mantaleengahan mountain bears S.E.  $\frac{1}{2}$  E.; and Bulanhow S.S.E.  $\frac{1}{2}$  E.

This shoal is in the form of an ellipsis, lying in a north-east and south-west direction one mile in length by three-quarters of a mile in breadth. The basin, in which there are 16 and 18 fathoms, sand, is completely enclosed by a belt, on which three or four rocks show at half tide, the most conspicuous being at the north extremity of the shoal. There are 30 fathoms outside the reef within 20 yards of the south-west and north-east extremes; but beyond, there is no bottom in any direction with upwards of 150 fathoms line.

The Bombay is the northernmost and smallest of this description of shoals in the Palawan passage.†

**Tides.**—It is high water, seven days after full and change, at the Bombay shoal, at noon; rise about 4 feet. While the tide was rising, the current was observed setting to the N.E.

**CARNATIC SHOAL** is said to lie about N.E. by N. 47 miles from the Bombay shoal, in lat.  $10^{\circ} 6'$  N., long.  $117^{\circ} 21'$  E., and to have as

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\* In clear weather the high land of Mantaleengahan is visible from this shoal.

† Mr. Wadge, Master of the *Bombay Castle*, reports having seen breakers in lat.  $9^{\circ} 42'$  N., long.  $117^{\circ} 25'$  E., distant from the Bombay shoal, N.E. by E., 32 miles. The *Mona* was in company at the time, and also saw the shoal.—From *Hydrographic Order Book, China Station*.

little as  $3\frac{1}{2}$  fathoms over it. H.M.S. *Royalist*, in July 1853, could not discover the shoal in the position assigned to it, or succeed in obtaining soundings with from 100 to 200 fathoms, when in the neighbourhood.

Other banks and dangers (outliers of the great prolific coral bed) are reported to exist to the north-eastward of this and the Bombay shoal, by vessels which have deviated from the proper channel course, all which appear to have no soundings near them.

#### DANGERS ON THE EASTERN SIDE

Having described the dangers and shoals which limit the western boundary of the Palawan passage, we shall now proceed with those on the eastern side, which lie immediately within the edge of the bank of soundings fronting the island. The south-west part of the bank forms an Elbow on the parallel of nearly  $8\frac{1}{2}^{\circ}$  N., from which cape Buliluyan, the south point of Palawan, bears E. by S.  $\frac{1}{4}$  S., Balábac peak S.S.E., and Bulanhow mountain E. by N.  $\frac{1}{2}$  N. The bank also extends to the northward fronting the Calamianes group.

**Herefordshire Shoal**, on which the ship *Herefordshire* struck in 1815, is in lat.  $8^{\circ} 35' N.$ , long.  $116^{\circ} 59' 19'' E.$ , about 15 miles to the north-eastward of the above Elbow; this occurrence might have been prevented had the lead been properly attended to, as the danger lies 4 miles within the edge of the bank. The position of this shoal was not determined by H.M.S. *Royalist*.

**North Regent Shoal**, situated N. E. by E.  $\frac{1}{4}$  E. 5 miles from Herefordshire shoal, is a dangerous coral patch, 4 cables in extent, having in some places only 9 feet water. It lies 6 miles within the edge of the bank, and  $9\frac{1}{2}$  miles from the nearest shore, with the S.W. or Triple Hill S.E.  $\frac{1}{4}$  E.; summit of Bulanhow mountain a little open south of Cancepahan hill, E.  $\frac{1}{4}$  S.; and the Pagoda (page 183), E. by N.  $\frac{1}{4}$  N.

At  $4\frac{1}{2}$  miles N.W.  $\frac{1}{3}$  W. from the North Regent shoal, and one mile within the edge of the bank, is a coral patch with 10 fathoms water; at  $1\frac{1}{2}$  miles to the north-eastward of which, and 2 miles inside the edge of the bank is another patch, 3 cables in extent, with only 5 fathoms on it. Also N.E. by E.  $\frac{1}{2}$  E.  $1\frac{1}{2}$  miles from the latter, is a 4-fathoms patch, 3 cables in extent; and a 7-fathoms knoll lies half way between the two. The soundings in the vicinity of the two latter shoals are 27 and 30 fathoms, sand and shells; the soundings near the former, which are within 2 cables of the 10 fathoms, being 60 fathoms, mud, with 74 and 77 fathoms between them and the edge of the bank. Between the North Regent and the above shoals the depths are from 30 to 45 fathoms, mud, and sometimes sand and broken coral.

**Breaker reef**, lying N.E.  $\frac{3}{4}$  E. 5 miles from the North Regent, is 3 cables in extent, and of triangular form, with a few rocks showing at

low water. It is 8 miles inside the edge of the bank, and 7 miles from cape Seeacle, the nearest shore; from Breaker reef S.W. or Triple Hill bears S.S.E.; Canepahan hill, S.E. by E.  $\frac{3}{4}$  E.; and the Pagoda, showing to the southward of a double hill on I-wi-ig range, E.  $\frac{3}{4}$  N.

Rocky ground, where there are only  $2\frac{3}{4}$  fathoms, extends  $1\frac{3}{4}$  miles to the westward of this reef; also northward of it  $3\frac{1}{4}$  miles there is a patch with  $4\frac{1}{2}$  fathoms; and another N.W.  $\frac{1}{2}$  W.  $2\frac{1}{2}$  miles from that, with  $6\frac{1}{2}$  fathoms: the soundings in the neighbourhood being 30 and 40 fathoms, except to the south-westward of the latter, where there are 16 and 20 fathoms, coral, half a mile from it.

**PARAQUAS RIDGE**, situated 11 miles N.  $\frac{1}{2}$  W. from Breaker reef, parallel with and a mile inside the edge of the bank, is formed of coarse sand and shells, 8 miles long in a N.E. and S.W. direction, with a narrow ridge of coral having gaps through it; on the ridge the least water found was 5 fathoms; the average depth being 6, 7, and 9 fathoms, with 20 to 30 fathoms close to. When on the extremes of Paraquas ridge the bearings were as follows:—

|                           | S. extreme in<br>26 fathoms. | N. extreme in<br>19 fathoms. |
|---------------------------|------------------------------|------------------------------|
| Bulanhow mountain - -     | S.E. $\frac{1}{4}$ S. -      | S. by E. $\frac{3}{4}$ E.    |
| Canepahan hill - -        | S.E. by S. -                 | S. $\frac{3}{4}$ E.          |
| Pagoda (Pagoda cliffs) -  | E. by S. $\frac{3}{4}$ S.    | S.E. easterly.               |
| Mantaleengahan mountain - | E. $\frac{1}{3}$ S. -        | E. by S. $\frac{1}{4}$ S.    |

The outer edge of this ridge is steep-to, having in many places 60 and 70 fathoms within 2 or 3 cables of it.

**Vanguard Shoal** is a coral patch 2 cables in extent, with only one foot water on it, lying E. by S.  $5\frac{1}{4}$  miles from the shoalest part of the Paraquas ridge, and 12 miles off shore, with Canepahan hill bearing S.  $\frac{1}{2}$  E.; Bulanhow S. by E.  $\frac{3}{4}$  E.; Pagoda S.E.  $\frac{1}{2}$  E.; and Mantaleengahan, E. by S.  $\frac{1}{4}$  S.

Between this shoal and Paraquas ridge the soundings are irregular, varying from 30 to 50 fathoms. To the south-westward of the latter they are from 70 to 80 fathoms, mud, when on the edge; 20 and 30 fathoms, coarse sand and broken coral, a mile inside; and 40, 45, and 50 fathoms, mud, when fairly on the bank.

**Scalesby Castle Shoal** is a dangerous coral patch, 2 cables in extent, with 15 feet water, and 32 fathoms close to lying in lat.  $9^{\circ} 5' N.$ , long.  $117^{\circ} 17' 11'' E.$ , N.E. by N.  $7\frac{1}{4}$  miles from the north extreme of Paraquas ridge, and  $1\frac{1}{2}$  miles within the edge of the bank. From this shoal Bulanhow bears S.  $\frac{3}{4}$  E.; Pagoda S.S.E.  $\frac{1}{2}$  E.; Mantaleengahan, a little open south of Illaan hill, S.E. by E. southerly; Sharp peak, a little

open south of a high peak on the Mantaleengahan range, S.E. by E.  $\frac{3}{4}$  E.; and Eran quoin E.  $\frac{1}{2}$  S.

**Collingwood Shoal**, lying N.E. by E.  $15\frac{1}{4}$  miles from Scalesby Castle shoal, and 6 miles inside the edge of the bank, is half a mile in extent, and on it the least water found was 13 feet, with 26 and 28 fathoms close to its western or outer edge: the soundings in the neighbourhood being 40 and 45 fathoms, stiff mud. From this shoal Eran quoin, the nearest land, bears S.E.  $\frac{1}{2}$  S. 12 miles; Pagoda (which is very conspicuous on this bearing over the low land, and generally discernible when the elevated objects are obscured), S.  $\frac{1}{2}$  W.; Mantaleengahan, S. by E.  $\frac{3}{4}$  E.; and Gantung, a high notch peak (page 184) S.E.  $\frac{1}{2}$  E.

To the N.N.W. of this shoal the edge of the bank projects a little beyond the general trend, and has on either side a less regular contour with bights, having soundings of 130 and 140 fathoms within a mile, and in some parts only 3 cables from the coral patches.

**Coral Patches.**—From the Scalesby Castle shoal to the parallel of  $9^{\circ} 30' N.$ , a distance of 35 miles, the coral patches on the edge of the bank of soundings are so numerous, that to give a description or bearings for each separately, would tend more to confuse than make clear the directions for the navigation of this part of the channel. The least water that has been found on them is 4 fathoms, and they may generally be distinguished by an ordinary look-out from the mast-head. It is, however, recommended to avoid them, as it is impossible to say whether there may or may not be shoaler parts which have escaped detection. The average depth upon the patches is from 6 to 7 and 9 fathoms, with 15 and 20 fathoms close to their edges.

**York Breakers**, on which the *Countess of London* is supposed to have been wrecked in November 1816, in lat.  $9^{\circ} 53\frac{1}{2}' N.$ , long.  $118^{\circ} 8' 26'' E.$ , is a dangerous coral shoal, 4 cables in extent, with one foot water, and, except in fine weather, generally breaks. It lies  $6\frac{1}{2}$  miles inside the edge of the bank, and is steep-to, having 45 fathoms close to the edge, the soundings contiguous to it being 40 and 50 fathoms, mud. From York breakers, Victoria peak bears S. by E.  $\frac{1}{2}$  E.; Anipahan, the northernmost of two sharp peaks, over Long point, S.E.  $\frac{2}{3}$  E.; mount Staveley E. by S.  $\frac{3}{4}$  S.; mount Peel E. by N.; and in clear weather Cleopatra Needle will be seen over Ulugan bay, nearly in line with Carsoglan hill E. by N.  $\frac{1}{3}$  N. (See pp. 197, 201.)

**Coral Patches.**—There is a coral patch, having only  $3\frac{1}{2}$  fathoms on it, lying S.W.  $\frac{1}{2}$  S. 4 miles from the centre of the York breakers; and  $1\frac{1}{2}$  miles westward of it is another, with 4 fathoms, the latter lying  $3\frac{1}{2}$  miles

inside the edge of the bank, with a bank of coarse sand intervening, on which the average depth is 18 and 20 fathoms.

The soundings in the neighbourhood of these shoals are from 40 to 50 fathoms, mud.

**Middle Shoal**, situated E. by N.  $\frac{3}{4}$  N.,  $16\frac{1}{2}$  miles from York breakers and 12 miles off shore, is 2 cables in extent, with  $3\frac{1}{2}$  fathoms, water, and 12 to 20 fathoms close to. From this shoal mount Peel bears E.  $\frac{1}{3}$  N. ; Anipahan peak S.  $\frac{3}{4}$  E. ; mount Staveley S.S.E.  $\frac{1}{4}$  E. ; and the summit of Long point S.  $\frac{1}{4}$  W.

**DIRECTIONS.**—Northward of the parallel of  $9^{\circ} 30' N.$ , the soundings on the bank are more regular, and the coral patches lying near the edge, except in the neighbourhood of York breakers, have generally more water on them than those to the southward, seldom having less than 7 and 9 fathoms to the parallel of  $10^{\circ} 40' N.$ , where they have as little as 4 fathoms in some places. Vessels, therefore, bound to Ulugan bay, or wishing to close with the land for the purpose of working up in shore, should cross the bank about this parallel, with mount Peel on an E.  $\frac{1}{2}$  S. or E. by S. bearing, or where it is still clearer on a S.E. by E.  $\frac{3}{4}$  E. bearing. The bank on this parallel extends 30 miles from the coast. The first soundings obtained on the edge will generally be 18 or 20 fathoms, coarse sand and broken coral, or perhaps 9-fathoms, coral, when the bottom will be visible, after which the depth will be more regular, the 40 and 50 fathoms soundings being chiefly on a stiff muddy bottom ; while in less water, sand and mud, or sand and broken coral, will predominate. Nearer the shore there are a less number of patches, and the soundings are more regular.

**Crescent Reef**, with 4 fathoms, water, in lat.  $10^{\circ} 40' N.$ , long.  $118^{\circ} 42' 26'' N.$ , is a narrow strip of coral, three-quarters of a mile in extent, in an E.N.E. and W.S.W. direction, lying  $1\frac{1}{2}$  miles inside the edge of the bank, and 22 miles from the nearest shore. There are 40 and 44 fathoms within half a mile of its edge.

From the centre of Crescent reef, Sangbowen, the north peak of Ulugan bay, bears S. by E.  $\frac{1}{4}$  E. ; Cleopatra Needle, S.S.E.  $\frac{1}{2}$  E. ; summit of Cacnipa or High island (page 203) S.E. by E.  $\frac{3}{4}$  E. : highest part of Boayan island (page 203) E. by S.  $\frac{1}{4}$  S., easterly ; and mount Capoas (page 206) E. by N.  $\frac{1}{4}$  N.

**The BANK** immediately west of Crescent reef follows apparently the contour of the coast line, and takes a sudden trend in a westerly direction for about 10 miles, with soundings of 60 and 75 fathoms. Northward of the reef it trends nearly north 9 nine miles, and north-east  $2\frac{1}{4}$  miles.

At  $2\frac{1}{2}$  miles south from the Crescent reef, there is a 7-fathoms patch, with soundings of 36 and 40 fathoms close to; and E.N.E.  $2\frac{1}{2}$  miles from the same is another, 3 cables in extent, having only  $4\frac{1}{2}$  fathoms on it, with 40 fathoms close to. Between these shoals and the shore, the soundings vary from 30 to 50 fathoms, and the ground appears to be free from danger.

**Capoas Cluster.**--In the vicinity of the above patches and between them and Crescent reef, the soundings are irregular, with several shoal spots of 5 and 6 fathoms, lying from one to 6 miles within the edge of the bank. They are too closely grouped and too far off shore for bearings to be of any advantage to navigate between them.

At  $10\frac{1}{4}$  miles N. by E. from Crescent reef is a 5-fathoms coral patch, lying only 4 cables inside the edge of the bank, with upwards of 40 fathoms water close to, and a 6-fathoms patch  $1\frac{1}{2}$  miles S.W. of it. From the former mount Capoas bears E.  $\frac{1}{2}$  S.-easterly,  $32\frac{1}{4}$  miles; the northernmost of the Four peaks on Cleopatra range S.S.E.  $\frac{1}{4}$  E., and the summit of Tapiutan island (page 218), N.E.  $\frac{3}{4}$  E.

At  $8\frac{3}{4}$  miles N.E. by E. from the 5-fathoms patch is a  $4\frac{1}{2}$ -fathoms coral patch, apparently the northernmost of the Capoas Cluster, 3 cables in extent, with 52 fathoms close to its western edge. It lies  $1\frac{1}{2}$  miles inside the edge of the bank, with mount Capoas bearing E. by S.  $\frac{1}{2}$  S., Chinongab peak (page 210) East-northerly; and the highest peak of Tapiutan island N.E.  $\frac{3}{4}$  E.

The least water that has been found on the Capoas cluster is  $4\frac{1}{2}$  fathoms. The soundings in the immediate neighbourhood are 40 and 50 fathoms. Vessels should avoid this part of the bank.

**The BANK** from the 5-fathoms patch above mentioned, trends north-eastward 9 miles, thence nearly North parallel with the line of coast.

From the northernmost of the Capoas cluster, the bank trends North a little westerly, preserving a distance of about 30 miles from the shore, to the parallel of  $11^{\circ} 12' N.$ , when it gradually takes a north-easterly direction and does not approach the north point of Palawan nearer than 23 miles. The bank is steep-to, 40 and 50 fathoms being close to the 100-fathoms line. Here and there it has comparatively shoal ridges (15 to 20 fathoms) of coarse sand and broken coral, on which there are some  $7\frac{1}{2}$  and 9 fathoms patches of coral lying close to the edge. The northernmost and shoalest of these that has been discovered, and on which there are 7 fathoms, lies  $1\frac{1}{2}$  miles inside the edge of the bank, in lat.  $11^{\circ} 28' 45'' N.$ , long.  $119^{\circ} 1' E.$  When on it the North hill of Palawan bears E. by S.-easterly; west shoulder of the High Table range, (page 223) S.E. by E.  $\frac{1}{2}$  E.;



Cadlao or Table-top island (page 221) S.E.  $\frac{3}{4}$  E. ; and the Horn on Martinloc island (page 218) S.E.  $\frac{1}{4}$  S. It is 26 miles distant from the nearest part of the island, and the depths in the vicinity vary from 20 to 40 fathoms.

The nature of the bottom near the patches is usually fine sand, but when fairly on the bank, especially off the north part of Palawan, stiff green mud predominates. The bank farther to the northward does not appear to be so steep as that abreast of the island, soundings with 160 fathoms having been found nearly 4 miles outside the 100-fathoms line.

## CHAPTER XIV.

## SHOALS LYING OUT OF THE TRACKS FOR VESSELS.

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VARIATION  $1\frac{1}{2}^{\circ}$  East in 1879.

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THE shoals lying in and bordering the ordinary routes to China have been given with the descriptions of those routes.\* The shoals about to be described lie out of the tracks for shipping, and the following valuable observations of Horsburgh should be carefully attended to :—

“The archipelago of sand-banks, rocks, or reefs above and under water lying between the coast of Palawan and Pulo Sapatu, is so extensive, and the dangers that form it so numerous, that there can be little utility in entering into a minute description of them, *for indeed they ought to be avoided by all navigators*. No ship can enter within the limits of this dangerous archipelago without getting embarrassed amidst the shoals ; there are strong currents or irregular tides among them, which render a ship's place very uncertain when observations cannot be obtained ; and the rise and fall of the tide is considerable amongst the shoals during the springs. Although some ships have with difficulty and risk passed through them, others have struck or lost their anchors amongst the extensive coral flats ; and many have been wrecked nearly in the middle of the archipelago.”

Most of the disasters which have happened to shipping in the China sea have been consequent upon a disregard of the above advice. In the following descriptions we shall first refer to those shoals which lie near the Main route, and afterwards those which lie nearer the Palawan passage.

## SHOALS NEAR THE MAIN ROUTE.

**Lizzie Webber Shoal.**—Mr. Dallas reported that while returning in a small vessel, the *Lizzie Webber*, to the wreck of the *Fiery Cross* (in 1860) they struck upon a reef in lat.  $8^{\circ} 4' N.$ , long.  $113^{\circ} 12' E.$  The reef, which was very little under water, is a narrow strip of sand and coral lying in a north-east and south-west direction.

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\* See Admiralty charts:—China sea, southern portion, Nos. 2,660 and 2,660a.

This shoal is supposed to extend about 25 miles to the north-eastward of the above position, for Mr. P. Orr, commanding the barque *Canada*, reported as follows :—\*

“On the 24th December 1864, at 12 30 a.m., the British barque *Canada* was wrecked on a reef in the China sea—not marked in the Chart I was navigating on, and corrected to 1863. The ship’s lat. brought on from the previous noon was  $8^{\circ} 20' N.$ , and long.  $113^{\circ} 29' E.$  After leaving the ship we skirted the weather side of the reef until noon : when we cleared the south end, I got a meridian observation which put us in  $8^{\circ} 3' N.$ ,—we were then about one mile south of the reef which is awash. I estimate the distance made in the boats from the time we left the ship till we cleared the south end of the reef to be 25 miles.” This latitude of the southern end of the shoal agrees within a mile with that of the *Lizzie Webber*.

**Pearson Reef** in lat  $8^{\circ} 56' N.$ , long.  $113^{\circ} 44' E.$ , was seen in 1843 by Mr. Pearson, commanding the *Bahamian*, who reported that he passed about 3 miles to windward of an extensive shoal in the above position, about 2 miles long in a north and south direction, with some rocks above water on the southern edge.

**Doubtful Shoals.**—Cornwallis south reef is placed on the Admiralty chart in lat.  $8^{\circ} 50' N.$ , long.  $114^{\circ} 11\frac{1}{2}' E.$ , and shown as being 3 or 4 miles in extent.

Ganges reef, 32 miles to the northward of Cornwallis south reef, in lat.  $9^{\circ} 22' N.$ , long.  $114^{\circ} 11' E.$

Fancy wreck shoal, 35 miles north-eastward of the Ganges reef, in lat.  $9^{\circ} 43' N.$ , long.  $114^{\circ} 41' E.$

Cornwallis reef is shown on the chart as an extensive reef with rocks, 20 miles to the north-westward of the last-named shoal, in lat.  $10^{\circ} 0' N.$ , long.  $114^{\circ} 23' E.$

Pennsylvania is placed in lat.  $10^{\circ} 0' N.$ , long.  $115^{\circ} 10' E.$ ; and about 20 miles N.N. W. of it, in lat.  $10^{\circ} 18' N.$ , long.  $115^{\circ} 4' E.$ , is another doubtful Ganges reef. About 14 miles N.N.E. of this latter, in lat.  $10^{\circ} 32' N.$ , long.  $115^{\circ} 8' E.$ , is Ganges north reef.

**Third Thomas Shoal** (1839) is placed on the chart in lat.  $10^{\circ} 52' N.$ , long.  $115^{\circ} 55' E.$ , and shown as being 3 or 4 miles in extent.

**Flat Island**, in lat  $11^{\circ} 1' N.$ , long.  $115^{\circ} 40' E.$ , is said to be low and flat, surrounded with breakers, and having a reef projecting from its north-east side. It lies nearly midway between the North Danger reef and the north-easternmost of the dangers bounding the Palawan channel, and is marked doubtful in the charts, but Horsburgh states that it has been seen by several ships.

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\* Straits Times, 8th February 1865.

## SHOALS NEAR THE PALAWAN ROUTE.

**Breakers**, in lat.  $7^{\circ} 38' N.$ , long.  $113^{\circ} 54' E.$ , were reported to have been seen in 1860 by Mr. Dallas, while proceeding from the wreck of the *Fiery Cross* to Labuan in the boats (page 288).

**Mariveles reef**.—The Spanish steam-vessel *Mariveles*, 1879, struck on a coral reef, reported to lie in lat.  $7^{\circ} 58' N.$ , long.  $113^{\circ} 50' E.$  This reef is said to be about 4 miles long, 2 miles broad, and to be nearly awash, with 54 fathoms close to.

**Gloucester, and Ardasier Breakers** are two doubtful shoals; the former is placed upon the chart in lat.  $7^{\circ} 50' N.$ , long.  $114^{\circ} 15' E.$ ; and the latter in lat.  $7^{\circ} 56' N.$ , long.  $114^{\circ} 2' E.$  Horsburgh remarks that the position of Ardasier breakers is very doubtful.

**Investigator Shoal**, examined by Captain Crawford of the Indian Navy surveying ship *Investigator*, in 1813, is very extensive; its western point being in lat.  $8^{\circ} 5' N.$ , long.  $114^{\circ} 31' E.$ , and its eastern extremity in lat.  $8^{\circ} 10' N.$ , long.  $114^{\circ} 50' E.$ , and it is about 4 miles in breadth, north and south.

**Cay Marino** is a doubtful shoal, placed upon the chart in lat.  $8^{\circ} 30' N.$ , long.  $114^{\circ} 21' E.$

**S.W. and N.E. Shea Shoals** were seen by Mr. Shea, commanding the *Buckinghamshire*, in 1833. The first shoal appeared to consist of two reefs of rocks, with high breakers, extending  $1\frac{1}{2}$  miles E. by S. and W. by N., and half a mile north and south, the centre of which was found to be in lat.  $8^{\circ} N.$ , long.  $114^{\circ} 55' E.$  by observations of sun, moon, and stars.

The other shoal, seen on the following morning, appeared to consist of two dry white banks, with a ridge of rocks extending from them to the westward about 2 miles, which was considered to be in lat.  $8^{\circ} 30' N.$ , long.  $115^{\circ} 19' E.$ \*

**Glasgow Bank**.—Mr. Baird, commanding the ship *Glasgow*, is said† to have discovered a bank in lat.  $8^{\circ} 39' N.$ , long.  $115^{\circ} 31' E.$  It apparently extended 3 miles to its north-east edge, and was composed of sand and rocky peaks, in some places 21 to 32 feet above the sea.

**Alicia Anne Shoal**.—Captain R. Kirby reports‡ having seen a reef in lat.  $9^{\circ} 25' N.$ , long.  $115^{\circ} 19\frac{1}{2}' E.$ , of lagoon form, 3 miles in length, N.W. by N. and S.E. by S. There is a slight rise of sand hill at its north-west end, and a reef of rocks at its south-east extreme, with several detached rocks around. There was a portion of wreck on the south-east end, and a junk with four boats close by; inside the lagoon there was a boat apparently fishing. Soundings were tried for at a quarter of a mile

\* These shoals are placed upon the Admiralty chart 4 miles West of the above positions.

† Nautical Magazine, 1865, p. 52.

‡ Mercantile Marine Magazine, 1865, p. 29.

from the south-east end, but no bottom with 100 fathoms of line. First Thomas shoal was made the next day, and the chronometer showed it to be 2 miles west of its position on the chart.

**First, and Second Thomas Shoals** appear by the chart to have been seen in 1839. The first is placed in lat.  $9^{\circ} 18' N.$ , long.  $115^{\circ} 53' E.$ ; the second is shown as an extensive shoal, 9 or 10 miles long north and south, and 4 miles broad; its southern part is in lat.  $9^{\circ} 41' N.$ , long.  $115^{\circ} 47' E.$

**Investigator N.E. Shoal**, in lat.  $9^{\circ} 15' N.$ , long.  $116^{\circ} 24' E.$ , is shown on the chart as having some rocks awash upon it.

**Pennsylvania and Sabina Shoals.**—One of the doubtful Pennsylvania shoals is placed upon the chart about 17 or 18 miles northward of the N.E. Investigator, in lat.  $9^{\circ} 31' N.$ , long.  $116^{\circ} 23' E.$ ; and there are three other patches of that name, the first in lat.  $9^{\circ} 47' N.$ , long.  $116^{\circ} 44' E.$ , the second about 4 miles and the third about 10 miles to the north-westward from it.

The Sabina shoal, placed upon the chart in lat.  $9^{\circ} 43' N.$ , long.  $116^{\circ} 34\frac{1}{2}' E.$ , was discovered by Mr. French, commanding the *Sabina*, of New York, in 1836, who saw "rocks with the sea breaking tremendously over them."\* Mr. French thought it was one of the doubtful Pennsylvania shoals, which in all probability it is.

Mr. E. Routh, commanding the *Bombay*, with the *Henry Clay* in company, sighted breakers which his observations placed nearly in the position of the Sabina shoal.†

**Lord Auckland Shoal** appears on the chart as a bank with 8 to 30 fathoms water over it. The 8-fathoms part is in lat.  $10^{\circ} 21' N.$ , long.  $117^{\circ} 17' E.$ ; close to the eastward of the bank there is no bottom at 100 fathoms.

**Other Pennsylvania Shoals.—Brown Shoals.**—Another Pennsylvania shoal is placed on the chart in lat.  $10^{\circ} 24' N.$ , long.  $116^{\circ} 33' E.$ ; and another, the Pennsylvania north reef in lat.  $10^{\circ} 49' N.$ , long.  $116^{\circ} 54' E.$ ‡ The positions of these are very doubtful, and it is probable that the shoals seen by Mr. Brown, commanding the *Arabian* in 1838, were the same; the following is Mr. Brown's account of them :—§

"On the 8th January 1838, on our passage to China by the Palawan, standing to the northward, wind N.E., at 10.30 a.m. passed close to windward of a coral patch, with apparently 5 or 6 fathoms water over it

\* Nautical Magazine, 1836, p. 601.

† Nautical Magazine, 1837, p. 224.

‡ Horsburgh places this shoal in long.  $117^{\circ} 10' E.$

§ Nautical Magazine, 1838, p. 721.

blowing fresh and a good deal of sea; could not lower a boat to determine. It lies in lat.  $10^{\circ} 30' N.$ , long.  $116^{\circ} 41' E.$

"Same day, lying up east on the port tack, at 3.30 p.m., came suddenly into shoal water. Saw the coral rocks very distinctly under the ship's bottom. Hove the lead over, first cast had 5 fathoms, and mark above water for a few casts. Put the helm up and run to the southward for a few minutes, until we gradually deepened to 30 fathoms, no bottom. We appeared to be on the southern edge of an extensive coral flat, extending N.E. and N.W. of us some miles. By sights taken immediately we came off the shoal, this part of it lies in long.  $117^{\circ} 0' E.$ , or  $4'$  east of the Bombay reef, which we left yesterday; latitude  $10^{\circ} 35' N.$ , which we observed at noon.

"The following day at 9 a.m., standing to the northward, with a fresh wind from N.E., and a heavy head sea, came again into shoal water; coral rocks seen very close to our keel, but before we could get the lead forward we had passed over the ridge into 28 fathoms. From 9h. to 11h. 30m. a.m. ran 8 miles on a N.N.W. course in irregular coral soundings, least water, by the lead, 11 fathoms, but at times we apparently had much less from the proximity of the coral rocks. We entered upon this flat in lat.  $10^{\circ} 39' N.$ , long.  $117^{\circ} 24' E.$ ; came off in lat.  $10^{\circ} 46' N.$ , long.  $117^{\circ} 19' E.$  The longitude computed from a series of sights before and after noon; the latitude by a good meridian altitude, four observers, and clear weather. In passing over this bank the water appeared very shoal east and west of us, lying in ridges in that direction.\*

**Amy Douglas Shoal.**—The *Amy Douglas*, commanded by Mr. Pensberry—under the Siamese flag—on her passage up the Palawan, passed over a shoal in lat.  $10^{\circ} 52' N.$ , long.  $116^{\circ} 25' E.$ † On February 12th, 1860, at noon, had good observations, and noticed about that time the water discoloured for about a mile on each side of the ship. Dropped the lead over the side and found 14 fathoms. Mr. Pensberry is of opinion that the water was much more shallow to the westward of the ship.

**Fairy Queen Shoal**, having 9 fathoms water over it, is placed on the chart in lat.  $10^{\circ} 39' N.$ , long.  $117^{\circ} 38' E.$

**Coral Bank.**—H.M.S. *Rifleman*, when proceeding from Loai-ta island (p. 66), round the northern edge of the Archipelago, obtained soundings of 47 fathoms on a coral bank in lat.  $11^{\circ} 28' N.$ , long.  $116^{\circ} 46' E.$ ; steering E. by S.  $\frac{1}{4}$  S. 3 miles farther, had 44 fathoms, and shortly afterwards 12 fathoms on a small coral patch in lat.  $11^{\circ} 26' N.$ , long.  $116^{\circ} 53' E.$  Continuing the same course, the depths were 42 fathoms for a distance of

\* The longitudes given in this account of the Brown shoals are corrected for the former position of the Bombay shoal, from which Captain Brown corrected his chronometer.

† Nautical Magazine, 1860.

5 miles ; at 8 miles 125 fathoms, and at 14 miles 175 fathoms ; a few miles farther on no bottom was reached with 200 fathoms of line.

**Seahorse, or Routh Shoal** was examined by the *Rifleman*. It lies at the north-east angle of the Archipelago of reefs, and forms the north-east limit of the Palawan passage. It is a pear-shaped coral bank 8 miles in length, N.N.E.  $\frac{3}{4}$  E. and S.S.W.  $\frac{3}{4}$  W.,  $4\frac{1}{2}$  miles in breadth at the north end and 3 miles at the south end ; it is not dangerous, the least water upon it being  $4\frac{1}{2}$  fathoms, which was found on a 5-fathoms patch, about three-quarters of a mile in extent, at the north extreme of the bank in lat.  $10^{\circ} 50' N.$ , long.  $117^{\circ} 46' E.$  Nothing less than 6 fathoms were obtained on any of the other patches surrounding the lagoon ; the depths in the lagoon vary from 17 or 19 fathoms at the shoal edges to 35 fathoms in the centre.

The northern part of this shoal was passed over by the *Seahorse* in 1786 and the southern part by Mr. Routh, commanding the *Bombay*, in 1835.

**A Sandy Shoal** is placed upon the chart in lat.  $11^{\circ} 2' N.$ , long.  $117^{\circ} 37' E.$

**Templer Bank.**—The *Minerva*, commanded by Mr. Templer, passed over a bank, to the north-westward of the Seahorse bank, in November 1835, having from 10 to 17 fathoms water on it. The bank appeared to extend about 4 miles north and south, and as no discoloured water was seen to the eastward, but several apparently shoal patches were perceived to the westward, it is supposed that the ship passed over the eastern part of the bank. The centre of the bank is in lat.  $11^{\circ} 7' N.$ , long.  $117^{\circ} 13' E.$

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## CHAPTER XV.

### GULF OF SIAM.

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VARIATION, 2° East in 1879.

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**WINDS and WEATHER.**—The north-east monsoon in the gulf of Siam sets in early in November. It is usually preceded by a month of squally, variable, and uncertain weather.\*

In the months of November, December, and January, the wind blows between N.N.E. and East; generally strong breezes, with the temperature occasionally as low as 65°. Along the eastern shore of the gulf at this time the sky is frequently unclouded for a week together, but on the opposite coast the weather is wet and stormy.

In November and December, strong squalls, with heavy thunder and lightning, are occasionally met with near Pulo Panjang.

Towards the end of January the wind blows more from the eastward, is steadier, and abates in strength.

In February the wind is more constant from E.S.E. than from any other point; it veers between S.E. and N.E. with occasional calms and squalls. Fine weather and smooth water now prevail all over the gulf.

In March the monsoon cannot be depended on. In the middle of the gulf calms prevail with southerly winds near the shore, and occasional land and sea breezes. Towards the end of the month the weather becomes hot and sultry.

April is the hottest month of the year; calms may be expected near the middle of the gulf; land and sea breezes near the shore, and occasional slight squalls. From the 2nd of April until the 15th of May 1856, the *Saracen* remained at anchor off the Bangkok bar, during which interval the river was surveyed, and the four-mile boundary line round the town of Bangkok defined. Towards the middle of April the weather changed and became gloomy and threatening; at the latter end of the month there were several days continuous and heavy rain, after which the

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\* The description of this gulf is by Mr. John Richards, master commanding H.M. surveying vessel *Saracen*, who surveyed it between the years 1856–58. This survey is believed to include every thing that our present trading relations in the gulf require for its safe navigation; but owing to the great extent of coast surveyed in a short space of time (upwards of 1,000 miles in twenty-two months), and the small force engaged on it, the gulf is in part but thinly sounded; caution is therefore recommended when navigating these parts.



weather became showery, and continued so during the remainder of the above period. On the 15th the *Saracen* sailed for Singapore, and in the upper part of the gulf had calms and light winds from the eastward, drawing round to the southward as the Redang islands were neared. A southerly current was experienced the whole way to Pulo Aor.

In May clouds begin to bank up, and an occasional shower relieves the intensity of a vertical sun. The south-west monsoon sets in about the middle of the month, sometimes preceded by light flaws of wind and fine weather, but usually with squall weather, and occasional heavy falls of rain. In June, July, and August the south-west monsoon blows strong, with occasional showers, but generally very fine weather along the western shore of the gulf; out in the middle a rough sea; and along the eastern shore strong breezes with much rain, and occasionally a fresh gale.

In September the wind is very unsteady, veering between S.W. and W.N.W. in strong gusts. Heavy and continuous rain may be expected in this month.

In October the wind veers between West and North, and abates considerably in strength; the rain squalls are less frequent. Towards the end of the month the wind settles in the north, and the cold weather and fine season set in. Sailing vessels bound to the gulf from Hong Kong will not profit much by leaving China earlier than the middle of this month.

At the bar of Bangkok river, land and sea breezes generally prevail, veering by the east or west according to the monsoon.

The south-west monsoon is scarcely felt close in shore, between cape Patani and the Redang islands, its course being interrupted by the high land in that neighbourhood. To the southward of Pulo Kapas it takes the direction of the coast, veering a few points on or off shore by day or night, under the influence, alternately, of the sea and land breezes.

White squalls are said to prevail in the gulf, particularly in the month of May.

Black squalls are frequent in the south-west monsoon; they rise in the westward, accompanied by a heavy bank of clouds, and blow with great violence for a short time, and are frequently accompanied by heavy rain.

Heavy gales are unknown in the gulf.

**CURRENTS.**—The currents in the gulf, near the middle are generally weak and variable, but near the land, in the strength of the monsoons, strong sets may be expected. In the south-west monsoon a strong northerly current was found, from Lem Chong P'ra to Sam-roi-yot point. In the north-east monsoon there is frequently a strong set across the head of the gulf to the westward.

In the neighbourhood of the Redang islands and Pulo Obi, the strong currents prevalent in the China sea may be expected. The China sea

current does not appear to enter the gulf farther than a few miles, but is said to set across its mouth in both monsoons.

The flood tide from the China sea appears to meet the western shore of the gulf, and divides somewhere near cape Patani; for at the Redang islands the flood sets to the southward, and at Singora and Koh Krah it was found setting to the northward.

**DIRECTIONS** for making passages between Singapore and the gulf of Siam are given at page 17.

### EXPLANATION OF TERMS.

| <i>Siamese.</i>    | <i>English.</i>    | <i>Siamese.</i>  | <i>English.</i>   |
|--------------------|--------------------|------------------|-------------------|
| Bang .....         | Village.           | Nam-tem-khrye    | Full tide.        |
| Bon .....          | Upper.             | Nam-long .....   | Ebbing tide.      |
| Buri .....         | City.              | Nei .....        | In.               |
| Dam .....          | Black.             | Noi .....        | Little, or less.  |
| Deng .....         | Red.               | Nok .....        | Out.              |
| Din niau .....     | Clay.              | Nei-qua .....    | Inner.            |
| Din-so-phong ..... | Chalk.             | Noi-qua .....    | Lesser.           |
| Fai .....          | Fire, light.       | Nok-qua .....    | Outer.            |
| Hin .....          | Rock, stone.       | Pā .....         | Forest.           |
| Hatsai .....       | Sandbank.          | Pak .....        | Mouth.            |
| Khào .....         | Mountain, hill.    | Pak-nam .....    | Mouth of a river. |
| Khào or Khaao      | White.             | Pom .....        | Fort.             |
| Khlon .....        | Mud.               | Rong-pa-si ..... | Custom-house.     |
| Klong .....        | Canal or creek.    | Sai .....        | Sand, gravel.     |
| Koh .....          | Island.            | Sào-thông .....  | Flag-staff.       |
| Kok .....          | Olives.            | Tha-leh .....    | Sea, lake.        |
| Lêm .....          | Point, promontory. | Thai .....       | Siamese.          |
| Láng-tao .....     | Bar (of a river).  | Thit nua .....   | North.            |
| Lang .....         | Lower.             | Thit tai .....   | South.            |
| Lat .....          | A cut, short cut.  | Thit tawan-ők    | East.             |
| Mai .....          | New.               | Thit tawan-tok   | West.             |
| Mé-nám .....       | River.             | Thi-thot-samó    | Anchorage.        |
| Muang .....        | Town.              | Wat .....        | Temple.           |
| Nam .....          | Water, or tide.    | Yot .....        | Peak.             |
| Nam-khún .....     | Rising tide.       | Yai .....        | Great.            |
| Nam-ó .....        | „ beginning of.    | Yai-qua .....    | Greater.          |

### WEST COAST OF GULF.\*

**PULO KAPAS**, the south-west point of which is in lat.  $5^{\circ} 13' N.$ , long.  $103^{\circ} 16' 4'' E.$ , is  $1\frac{1}{2}$  miles long, north and south, three quarters of a mile broad, and elevated 478 feet. A large rock lies one cable north-west of

\* See Admiralty chart:—Gulf of Siam, No. 2414; scale  $m=0.04$  of an inch; Pulo Kapas to cape Patani, No. 998; scale  $m=0.23$  of an inch.

it. The island is fertile, and inhabited by fishermen, who cultivate a few vegetables for their own consumption. A small quantity of good water may be procured from wells dug by the natives near the middle of the island.

The channel between Pulo Kapas, and the main, is  $2\frac{3}{4}$  miles wide, and safe, having sandy bottom and regular soundings. Good anchorage will be found in it, within half or three-quarters of a mile of the island.

**TRINGANO HEAD**, bearing W.N.W. distant about 5 miles from the north point of Pulo Kapas, and S.S.E.  $\frac{1}{2}$  E. 6 miles from the entrance of Tringano river, is remarkable as the only rocky point in the neighbourhood.

**A Rock awash** at high water lies a quarter of a mile from the beach, and  $1\frac{1}{2}$  miles to the southward of the Tringano river entrance.

**TRINGANO RIVER.**\*—The entrance to this river may be easily known by the large gap or opening in the coast line, as well as by a remarkable cone, situated one mile southward of the town. There is also in the town a small steep hill, 100 feet high, with a fort, on which the Rajah's flag is displayed when a vessel passes within signal distance.

The river has a bar with 7 feet over it at low water. Within the bar, and immediately off the town, there is good anchorage in 5 fathoms, but the river above the town is shallow. The Rajah is hospitable to strangers and the natives of the coast are friendly. Wood, water, and fresh stock can be procured at reasonable rates.

**Tides.**—It is high water, full and change, at the entrance of Tringano river, at 8 h. ; springs rise 7 feet (irregular).

**Eulo Rocks.**—The coast from the entrance of the Tringano trends north-westward, and is low and slightly convex to Eulo village, where the high land approaches close to the beach. The Eulo rocks, a small group of 6 feet elevation, lie immediately off the village, an eighth of a mile from the beach, N.N.W.  $\frac{3}{4}$  W. 9 miles from the entrance of Tringano river, and S.E.  $\frac{1}{2}$  E. 8 miles from Seal bluff, which is inside the Seal rocks.

**Seal Rocks** consist of three rocks, the extremes of which lie north and south, nearly a mile apart. The southernmost rock is elevated 7 feet, the middle rock 2 feet, and the northernmost 3 feet; there are deep channels between them.

The southernmost Seal rock lies nearly  $2\frac{1}{2}$  miles from Seal bluff, having a good channel between it and the bluff, with regular soundings. Care, however, is necessary when standing towards the bluff to avoid a rock, awash at low water, lying north a quarter of a mile from the bluff. To

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\* See Admiralty plan of Triugano river entrance, on sheet, No. 998.

avoid the foul ground off the bluff, as well as off the southernmost Seal rock, do not approach either of them nearer than half a mile.

**Little Redang Island**, 985 feet high, lies N.E.  $\frac{1}{2}$  E.  $7\frac{1}{2}$  miles from Seal bluff; there is a small islet half a mile south of Little Redang, having in the channel between 11 fathoms water.

**Pulo Gulu** is a small islet situated  $1\frac{1}{2}$  miles north of Little Redang, with a smaller islet a quarter of a mile from its north extreme.

**Pulo Yu Kuchi and Pulo Yu Besar**, situated 5 miles east of Little Redang, are two small islands a mile apart in a north and south direction, with 24 fathoms midway between them. Pulo Yu Kuchi, the southern island, is 209 feet high, and Pulo Yu Besar is 316 feet high.

**Bukit\* Trokit** is a rock elevated 140 feet above the sea, lying 4 miles northward of the Seal rocks. There is a rock, only 5 feet high, nearly a mile westward of it.

**House Rock**, lying N.W.  $\frac{1}{4}$  N.  $10\frac{3}{4}$  miles from Seal bluff, is so named from its appearance.

**GREAT REDANG**, 1,139 feet high, situated 10 miles north-east from House rock, is 4 miles long north and south, 3 miles broad, and safe to approach on all sides. It has several small islets and rocks on its south and east sides, but they are all bold-to. There is plenty of wood and good fresh water, turtle may be caught in abundance on a beach at the north part of the island. There is a bay on the north side, and a small harbour on the south side of the island, the heads of which are connected by low land, giving to Great Redang the appearance of two islands at a distance. The harbour is protected to the southward by Pulo Pinang, and, although small, might be useful to a vessel in distress or in want of repairs. The passage northward of Pulo Pinang has 5 fathoms in it, but it is only a cable wide, and dangerous when the tide runs strong.

There is a village on Pulo Pinang, and a few huts scattered in different parts of Great Redang. The chief man holds his office from the Rajah of Tringano. The natives are civil, but they have nothing to sell beyond a few cocoa-nuts. A vessel requiring wood and water in the south-west monsoon will find it convenient to anchor in 10 fathoms with Bukit Mara, a small islet off the south part of the island, bearing south distant half a mile. At  $1\frac{1}{2}$  cables N. by W.  $\frac{1}{2}$  W. from Bukit Mara lies a rock awash at low water.†

**Pulo Lantinga**, 520 feet high, at 5 miles west of Great Redang, is  $1\frac{1}{2}$  miles long N.W. and S.E. and half a mile broad.

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\* Bukit means hill, in Malay.

† See Admiralty plan of Great Redang harbour, on sheet, No. 998.

**PRINTIAN ISLANDS.**—This group, lying about 15 miles north-westward of Great Redang, is also safe to approach. The channel between the two large islands, the easternmost of which is 1,134 feet high and the westernmost 1,195 feet high, is nearly half a mile wide in the narrowest part, in which rocks above water extend a considerable distance from the eastern island. There is good anchorage on either side of the channel, but the most secure is to the southward.

The islands are inhabited, but fresh water is scarce. The channel between the large islands and the rocky group 3 miles to the north-westward is safe.

**Turtle-Back Island**, so named from its peculiar shape, is elevated 346 feet, and bears N.W. distant  $26\frac{1}{2}$  miles from Seal bluff. The intermediate coast is low with a sandy beach until within 2 miles of the island, where there are two bluffs; after which it is again low and sandy to the entrance of the Kalantan river. Between Tringano and Turtle-back island, at the distance of several miles inland, there are two ranges of high mountains; the northern one and nearest the coast is elevated 3,388 feet.

The channel between Turtle-back and the Printian islands, as well as the passage between it and the main, is safe.

**Water.**—The only convenient watering place along this line of coast is at Great Redang island.

**KALANTAN RIVER.**—From Turtle-back island the coast trends N.W.  $\frac{3}{4}$  N. 30 miles to the east point of Kalantan river. There are no dangers on any part of it that are not apparent, and attention to the lead will always indicate the distance from the land.

The town of Kalantan stands on the right bank of the main river, 5 miles from the entrance, near the confluence of its delta, which consists of five streams. The main river at the town is about 2 cables broad and 2 fathoms deep; its banks here are very sandy. The town extends about a mile along the river front, and seems to be densely populated. The greater part of the population are Malays; the remainder are Chinese; Siamese were not seen. The houses are built chiefly of bamboo and atap. The only brick buildings observed were the mosques and the Rajah's residence. The Rajah is a Malay, subject to the King of Siam; both he and his people are friendly and courteous to strangers. There are two markets in the town, the principal one is near the Rajah's palace.

At the time of the *Saracen's* visit there were about twenty large trading prahus at anchor off the town, and one Singapore cargo boat loading with stock for Singapore. The whole delta of the river is very

fertile and highly cultivated. It produces immense quantities of cocoa-nuts and a great variety of fruits. Of vegetables were noticed maize, rice, potatoes, beans, vegetable marrow, cucumbers, melons, &c. Tobacco is extensively cultivated, and all vegetable produce is very cheap. Bullocks, sheep, goats, and fowls were plentiful. Dollars are current.

The main branch of the river is the third stream from the eastern one, and is said to have at this time (in 1856) 9 feet over the bar at high water springs. The delta of the river is said to be continually altering during the north-east monsoon. The river entrances are sometimes blocked up altogether, from the effects of a gale of wind, and new ones formed; the tortuous course of some of the streams near the sea beach tends to confirm this report. The deposits brought down by these streams have thrown out a sandy point to seaward, near the middle of the delta, where the main entrance now is; this point therefore is a good mark for the place.

**Directions.**—Vessels approaching the river from the south-eastward will be guided to it by three small hills, situated near the coast, 13 miles to the southward. Two of these hills (close together) are called the Paps, and are elevated 300 feet; the third, named Wedge hill, is elevated 400 feet, and separated a short distance. The Paps bearing S. by E.  $\frac{3}{4}$  E. will be in line with the sandy point near the main entrance of the river.

**The COAST** for 25 miles westward from the main entrance of the Kalantan has not been surveyed, but it is believed to be safe, and to have regular soundings.

It is all low land for the above distance, at the termination of which there is a remarkable conical hill standing on the coast line. This hill is elevated 1,158 feet, and bears S.E. by S. 17 miles from Baltu Rackil.

**Baltu Rackil**, in lat.  $6^{\circ} 40' 36''$  N., long.  $101^{\circ} 43' 56''$  E., is a white rock elevated 35 feet, and quite steep-to; between it and the main there is a channel 3 miles wide, with 8 fathoms water near the middle, and regular soundings.

**HILLY CAPE** is the northern extreme of a chain of hills, rising far in the interior and crossing the parallel of Kalantan 25 miles westward of it; the cape forms an angle of the coast, remarkable from its two steep bluffs. The easternmost bluff bears from Baltu Rackil N.W.  $\frac{1}{4}$  W. 15 miles; from Pulo Lozin S.W.  $\frac{1}{4}$  S. 41 miles; and from cape Patani E. by S.  $\frac{1}{2}$  S. 16 miles.

**Pulo Lozin**, in lat.  $7^{\circ} 21'$  N., long.  $102^{\circ} 1' 48''$  E., is 7 feet above high water, steep-to all around, and in size and appearance resembles a

vessel of about 100 tons burthen bottom up. Soundings of 20 fathoms were obtained at the distance of  $1\frac{1}{2}$  cables S.S.E. of it.

**CAPE PATANI** is a low narrow sandy point covered with trees, situated W. by N.  $\frac{1}{2}$  N. 14 miles from Hilly cape. Loftus bank, composed of hard sand, with 9 to 18 feet water, lies on the north-east side of cape Patani; this bank is  $2\frac{1}{2}$  miles long W.N.W. and E.S.E., and about a quarter of a mile broad, having between it and the shore a channel one mile wide, in which there are depths of 3 to 4 fathoms, mud. The soundings for 4 or 5 miles northward of the cape are irregular, denoting rocky patches, but no dangers have ever been reported.

**Patani Roads**, \* on the west side of cape Patani, affords anchorage in 2 to 5 fathoms, soft mud, the soundings decreasing gradually towards the shore.

The high trees on the right bank of Patani river, at 3 miles south of cape Patani, bearing S.E., is a good mark to steer into a suitable depth.

The town of Patani stands on the right bank of the river about half a mile within the entrance, and is said to be a good place to purchase stock.

**Enemy Chaser Shoal**, with 9 to 18 feet water, lies on the west side of Patani roads,  $2\frac{1}{4}$  miles from the shore, with cape Patani bearing E. by N.  $\frac{1}{4}$  N.  $9\frac{3}{4}$  miles.

**Tides**.—It is high water, full and change, in Patani roads, at 10h.; springs rise  $2\frac{1}{2}$  to 3 feet.

**SINGORA**.—The coast from cape Patani trends in a westerly direction 26 miles to abreast Row island, a small island about a mile from the shore, thence north-westerly 22 miles to Singora, which may be recognised by Pulo Ticos 279 feet high, and Kewchin 149 feet high, two small islands off the port; also by Kow Deng Yie (Table hill), 588 feet high on the west side, and Kow Tang Quan or Pagoda hill, 307 feet high, on the east side of Inner harbour; there are two pagodas on Kow Deng Yie and one pagoda on Kow Tang Quan. The land northward of Kow Deng Yie is low; to the southward the coast is hilly. The town of Singora stands on the east side of Inner harbour about a mile from the entrance.

The banks on the bar, and the middle ground within Singora harbour, are continually changing in form and depth, owing to the strong ebb tides, and to the heavy seas which break into the harbour during the north-east monsoon; the shoals should therefore be buoyed before attempting to enter the channel, which will be found nearly  $1\frac{1}{4}$  miles north of the harbour; there is 6 feet water on the bar between North and South banks, deepening to 20 and 25 feet between South bank and Lem Pom Dang, the western entrance point of the harbour.

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\* See Admiralty plan of Patani roads, on sheet, No. 998.

**Anchorage.**—During the north-east monsoon small vessels may anchor in 16 feet mud, about a quarter of a mile from the south-west side of Pulo Ticos; and during the south-west monsoon, in 15 or 16 feet at half a mile south of Pulo Ticos. Large vessels should anchor in 5 or 6 fathoms with the south extreme of Pulo Ticos bearing west. There is good anchorage in Inner harbour in 17 or 18 feet on either side of middle ground, or in 22 feet a little south of the Governor's house.

**Supplies.**—Wood and water may be purchased at the town, or the latter may be obtained from a spring just within the bar under Kow Deng Yie. Stock of every description is plentiful and cheap, and the natives (Siamese) are civil and willing to trade. There is frequent overland communication between Singora and Penang via Quedah. Elephants are used to perform the journey to Quedah, which they accomplish in four days.

**Tides.**—It is high water, full and change; in Singora harbour at 8h. 30m.; springs rise 2 to  $3\frac{1}{2}$  feet in the south-west monsoon. During the north-east monsoon the tide rises 6 feet, covering the North and South banks; also the cluster of rocks adjacent to Lem Meevah, nearly a mile east of Singora; at the same time the highest of the Look Mov Nai cluster of rocks 6 feet above water, situated nearly a mile N.N.W. from Pulo Ticos, will be visible; and Look Moo Nok, a cluster of rocks 4 feet high, three quarters of a mile N.E. from Pulo Ticos, will be awash.

**Koh Krah**, in lat.  $8^{\circ} 24' 47''$  N., long  $100^{\circ} 45' 27''$  E., is half a mile long, a third of a mile broad, and 530 feet high. Two high rocks, and a rock awash, lie to the southward. A small quantity of stagnant fresh water may be obtained on this island, and turtle are plentiful.

**The COAST** between Singora and the north extreme of Pulo Tantalum (Koh Yai) appears clear, with tolerably deep water (bottom mud) close to. Lamcolam Pook is a narrow curved spit of coarse sand, 6 miles long and 100 yards across the broadest part, with a cluster of fir trees on its extremity, off which the water is shoal, continuing so to the mouth of Ligor river at  $5\frac{1}{2}$  miles W.  $\frac{1}{2}$  N. from it, whence it gradually deepens to the northward.

Between Lamcolan Pook and Ligor the land forms a deep bight to the southward where a river named Pakinham,  $1\frac{1}{4}$  miles wide at its mouth, leads to the inland sea. This bight is only navigable for small boats at high tide.

**Directions.**—Vessels bound to Ligor roads should round Lamcolan Pook at a distance of 4 miles, steer to the westward and anchor according to draught. If from the northward, keep inshore, and anchor in a suitable depth near the inner fishing stakes. Vessels can frequently work near the shore against the south-west monsoon.



**Caution.**—The coast between cape Pantani and Choom Pawn (Tseoom Pyoon) river, in lat.  $10^{\circ} 30' N.$ , is little known and should be approached with caution.

**LEM CHONG P'RA**, or cape Chong P'ra, is a remarkable craggy headland of 1,060 feet elevation, in about lat.  $10^{\circ} 54' N.$ , long.  $99^{\circ} 30' 18'' E.$  A narrow island, named Koh Buot, 900 feet high, lies 2 miles south-westward of the cape, and within the island is a snug bay named Chong P'ra. There are four small islets or rocks to the south-eastward of Koh Buot, the two outer of which are 100 feet high, and lie N.N.E. and S.S.W.  $1\frac{1}{4}$  miles apart; the northern rock of the two is S. by E. 6 miles from the cape.\*

**LEM TONG LAN.**—From Lem Chong P'ra, Lem Tong Lan bears N. by E. distant 18 miles. About midway within the bay formed by these points, is Koh Tlu, a level cliffy island, 342 feet high, and nearly  $1\frac{1}{2}$  miles long. Within this island to the south-westward are two rocky islets named Chang and Sing. There is no safe passage for vessels between Sing and Koh Tlu. Excepting the foul ground about Koh Tlu, the bay is safe.

Lem Tong Lan is 814 feet high, and the coast being very low within it at a distance it makes like an island. At 11 miles northward of Lem Tong Lan, there is a remarkable clump of conical hills, and a low dangerous island lies immediately off them, at the distance of a quarter of a mile from the shore.

From Lem Tong Lan, Koh Chan, an island 80 feet high, lying 4 miles off the coast, bears N.N.E., and the distance is 27 miles, and to Koh Luem it is 37 miles, or nearly the same line of bearing.

**Koh Luem**, 406 feet high, is the outermost of several islands which lie off the bays named Ao-ti-bon-lai (?), and Ao-ti-now (?). The middle and southern peninsulas forming these bays have each a remarkable rocky horn that may be seen 30 miles off.

Ao-ti-bon-lai, the northern bay, affords the best anchorage. At 15 miles W.S.W. from the south point of Ao-ti-now is the mountain named Kow Luang, elevated 4,326 feet, which is by far the most conspicuous landmark on the whole coast.

**Koh Ta-kut**, 300 feet high, situated about N.N.E. 28 miles from Koh Luem, is one mile long, N.N.E. and S.S.W., and a quarter of a mile broad, the coast between these islands is clear, and the soundings regular. There is a small island and several rocks lying within Koh Ta-kut.

**SAMROIYOT HILLS.**—Cui point (corrupted by Europeans into Cin), the eastern extreme of the mainland, forming the west point of

\* See Admiralty chart: Gulf of Siam, sheet 1, No. 2,719; scale,  $m = 0.25$  of an inch.

entrance to the deep bay at the head of the gulf, situated about half a mile south of Koh Ta-kut,\* is the end of a spur extending from a remarkable clump of rocky hills near the coast, named Samroi-yot, or Three Hundred peaks. At a distance their appearance is that of a serrated table island ; the highest peak is elevated 1,900 feet.

Samroi-yot is unlike any other land in the gulf, and all vessels bound to Bangkok in the south-west monsoon endeavour to make it.

**Water.**—The only fresh water to be obtained between Chong Pra and Cui point is from wells, which have been provided at places, convenient for the use of native craft by wealthy benevolent Siamese.

**Pran Rocks**, two in number, and each 100 feet high, bear N.  $\frac{3}{4}$  W. 17 miles from Koh Ta-kut ; they lie north and south about three-quarters of a mile from each other, and are distant about a mile from the coast. The village of Pran stands on the shore at the entrance of a river 4 miles southward of these rocks.

Between Koh Ta-kut and the Pran rocks is a dangerous rocky patch of 6 feet water, from the centre of which the north point of Koh Ta-kut bears S.  $\frac{1}{4}$  E. 8 miles, and a remarkable head on the coast line W.S.W. 2 miles. Vessels should not approach this part of the coast nearer than  $2\frac{1}{2}$  miles, nor stand into less water than 7 fathoms.

A small headland stands out prominently from the coast line at 2 miles N. by W. from the north Pran ; and East, three-quarters of a mile from the centre of this headland, is a rock which covers at half flood.

**CHULAI POINT** is 34 miles N.  $\frac{3}{4}$  E. from the Pran rocks. At 17 miles N. by E.  $\frac{1}{4}$  E. from the north Pran there is much rocky ground, and some dangerous patches of only 2 fathoms water lie 5 miles off shore ; from the outer patch Chulai peak bears N.W. by W.  $\frac{3}{4}$  W.

When passing the neighbourhood of this rocky ground it is recommended not to approach the coast nearer than 5 miles, nor to stand into less water than 7 fathoms. Bearings of Chulai peak (an isolated craggy mountain 1,200 feet high), and other good landmarks whose positions are fixed on the chart, will enable the stranger to avoid the dangers in this locality.

**The COAST** about Chulai point and to the northward of it is all very low. The edge of the bank extends a considerable distance from the shore and is steep-to, especially off the village of Banlam, 8 miles northward of Chulai point, where there are only 12 feet at the distance of  $3\frac{1}{2}$  miles from the shore.

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\* See Admiralty chart :—Gulf of Siam, sheet 2, No. 2,720 ; scale,  $m = 0.3$  of an inch.

Immediately round Banlam point the low coast trends to the north westward, and the soundings in the offing become regular. From this point along the head of the gulf to the bar of Bangkok river the lead will be found a safe guide by day or night.

The town of Pechaburri is 8 miles up a river, the principal entrance to which is  $5\frac{1}{2}$  miles north-west of Banlam point. It is clean, well built, and densely populated, the centre of a great rice-producing district, and evidently of considerable importance. In point of climate it is preferable to Bangkok, and more likely to agree with the constitutions of Europeans. The anchorage off the entrance of the river is far more sheltered in the south-west monsoon than that off the bar of Bangkok river, and cargo might be safely embarked at all times.

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#### EAST AND NORTH COASTS OF GULF.

**PULO OBI**, the main island of the Obi group, lies about 11 miles S.E. by S. of Cambodia or Camão point (p. 308), the east entrance point of the gulf of Siam. The island is nearly  $2\frac{1}{4}$  miles long N.N.E. and S.S.W., and rather narrow near the middle, the widest and highest part being the south-west, which is elevated 1,046 feet. From its south-west end Camão point bears N.N.W.  $\frac{3}{4}$  W. 12 miles; and Hull rock S.E.  $\frac{3}{4}$  E. 4 miles. There are also two small islands within a mile of the south east point of Obi, which contracts the channel between them and Hull rock to little more than 2 miles. The approaches to, and passages between, all these islands, are quite safe by keeping at a prudent distance from the shore. The *Saracen* ran between Obi and the Hull rock, and anchored on the west side of the island in 5 fathoms at about half a mile off shore.\*

The channel between Pulo Obi and the depth of 3 fathoms on the bank extending from the coast of Cambodia is rather less than 2 miles wide, has 6 to 15 fathoms in it, and is quite safe to navigate. Marsh reef, lying N.  $\frac{1}{2}$  W.  $3\frac{1}{4}$  miles from the north point of Obi, is a dangerous group of rocks awash at low water.

There are two small pebbly bays, one on the north-west the other on the south-east side of Pulo Obi. The best anchorage is directly off these bays, on either side of the island, according to the monsoon, at about half a mile from the shore.

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\* See Admiralty plan of Pulo Obi on chart of gulf of Siam, sheet 5, No. 2,723; scale,  $m = 0\cdot25$  of an inch.

**Water.**—Fresh water is plentiful in each of these bays, but the shores are not convenient for embarking it. All the islands are densely wooded, the ground near to the western bay appears to have been under cultivation, and the cassava root was growing; not any signs of inhabitants were seen.

In September 1858, H.M.S. *Pique* found the watercourses dry in the north-west bay, and 90 tons of water in about 40 hours were obtained from the streams in the south-east bay, which will be readily known by its strip of white sand; but owing to the many rocks and stones long hoses were required to reach the boats, and care should be taken if a swell sets in. In December of the same year H.M.S. *Esk* watered from a stream discharging into the sea in the north-west bay, and two lengths of hose filled the casks without moving them from the boat. The vessel anchored in  $4\frac{1}{2}$  fathoms at a mile off shore.

**Tides.**—H.M. steam vessel *Salamander*, 21st February 1852, anchored in  $5\frac{1}{2}$  fathoms, soft muddy bottom, 2 cables from the west point of Pulo Obi. Heavy gusts of wind from N.E. to East. The tide was ebbing and ran strong to the N.N.E. until 11 a.m., when it turned and the flood ran strong to the S.S.W. round the west point. High water about 4 h. 30 m. p.m.; the rise 6 feet. Moon's age two days.

The *Pique*, when at anchor in September 1858 on the east side of the island, found the flood running to the N.E., the ebb to the S.W. There is a discrepancy here in the directions of the streams, but may it not arise from their being influenced by different monsoons? The *Pique* anchored in 10 fathoms, with the south-west end of islet (541 feet high) bearing S. by E.  $\frac{1}{2}$  E., the south-east point of Obi W.S.W., and distant 2 to 3 cables from the nearest part of the island.

**PULO PANJANG**, the main island of the Panjang group, in lat.  $9^{\circ} 18' 14''$  N., long.  $103^{\circ} 28' 14''$  E., is 3 miles long, East and West, 2 miles broad, and of a nearly uniform height of 550 feet, making like table land from the sea in every direction. There are two small islands at about a mile from its east end, with deep channels between. Peak island is a small island connected to the south point of Pulo Panjang by a ridge of rocks, with only 6 feet water on it. There is also a large white rock, 75 feet high, S. by W.  $1\frac{3}{4}$  miles from its south point; and two large rocks, named East island and Table rock, elevated 110 and 40 feet respectively, bearing from the north-east part of Panjang N.E. by E.  $8\frac{1}{2}$  miles.\*

During the north-east monsoon the bay on the south-west side of Pulo Panjang affords shelter and good anchorage. There is a small rock, elevated only 4 feet above high water, bearing S.W. nearly three-quarters

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\* See Admiralty plans of Pulo Panjang and Pulo Way, on chart of gulf of Siam, sheet 4, No. 2,722; scale,  $m = 0.25$  of an inch.

of a mile from the western point of the bay ; this is the only danger near, as the shores of the bay are safe to approach to a reasonable distance. Fresh water and wood can be obtained in abundance in the bay, and fish may be caught with a seine. The anchorage on the south-east side of the island is very indifferent. Pulo Panjang is not inhabited.

**Caution.**—Pulo Way, Veer islet, Koh Prins, the Tanqualah group, and the Depond reef, were surveyed ; and the soundings taken in the neighbourhood seem to denote that the passages between them are safe ; but as time would not permit these approaches from the northward and westward to be sounded, caution must be observed when steering for them from those quarters.

The channel between these islands and Koh Tron is believed to be quite clear and safe.

**Pulo Way**, or Koh Kwang Noi, about 50 miles north-west of Pulo Panjang, consists of two islands 250 feet high, each being nearly 2 miles long, E.S.E. and W.N.W., and a quarter to three-quarters of a mile broad. They are distant nearly a mile from each other, East and West, and the channel between them is quite safe. A rock elevated only 3 feet above high water, lies E. by S. three-quarters of a mile from the east point of the eastern island ; and Saracen rock, on which the *Saracen* struck, with only 4 feet on it, lying N. by W.  $\frac{1}{2}$  W. three-quarters of a mile from the north-west end of the same island.

Good anchorage will be found off the north side of the eastern island but the best berth is off a sandy bay on the north-east side of the western island. The *Saracen* anchored off this latter bay in 8 fathoms at a quarter of a mile from the shore.

The natives obtain their fresh water from a well about the middle of the eastern island ; and from appearance, good water might be obtained in this way on any part of either island at a moderate distance from the shore. The islands are covered with wood ; the beaches afford turtle ; and a single cast of the seine will generally procure a boatload of fish.

**Depond Reef**, in lat.  $9^{\circ} 58\frac{1}{2}'$  N., long.  $103^{\circ} 6' 20''$  E., is about half a cable in diameter, just awash at low water, steep-to on all sides, and in fine weather might not be noticed until close upon it. From it the peak of Tanqualah is faintly seen bearing N.  $\frac{1}{2}$  W., distant  $19\frac{1}{2}$  miles ; and the peak at the south end of the western Pulo Way is visible over the middle of the eastern Pulo Way, W. by S.  $\frac{1}{2}$  S. nearly,  $14\frac{1}{2}$  miles. The islands forming Pulo Way are well in sight from an elevation of 15 feet.

**Koh Tang**, or Tanqualah island, bearing N.N.E.  $\frac{3}{4}$  E.  $23\frac{1}{2}$  miles from Pulo Way, is  $3\frac{1}{4}$  miles long, very narrow, and has a peak rising to an elevation of 440 feet near its north end. The fine clean sandy bay on its

eastern side will afford good anchorage in the south-west monsoon; and Shelter islet, lying in the middle of the bay, would afford some shelter to a vessel wishing to anchor here in the north-east monsoon. Within this islet will be found 7 fathoms water.

**Condor Reef**, in lat.  $10^{\circ} 43' 40''$  N. and long.  $102^{\circ} 53' 20''$  E., is about half a cable in extent, having six rocky heads on which the depth varies from one to 6 feet, the shoalest part being near the south-western extreme. Eastward of the reef at a distance of half a mile, there is a depth of 13 fathoms, deepening suddenly to 16 fathoms; westward at a distance of a quarter of a cable, there are 6 fathoms, deepening suddenly to 16 fathoms, with 22 fathoms at less than 3 cables.

From the shoalest part of Condor reef, the north-west islet of Koh Samit bears N.E.  $\frac{3}{4}$  N.; the small island between Koh Rong and Middle island E. by N.  $\frac{1}{4}$  N.; and the summit of Koh Rong East, distant 17 miles.

At  $3\frac{3}{4}$  miles S.W.  $\frac{1}{2}$  S. from Condor reef, a depth of 9 fathoms exists, with 15 to 20 fathoms close around. It is said that a reef has been seen near this position.

**Hans Reef**, the position of which is doubtful, is said to lie in lat.  $10^{\circ} 42'$  N., long.  $102^{\circ} 35' 30''$  E.

**Reported Shoal**.—Mr. John Phillips, Master of H.M.S. *Vigilant*, mentions that the French report a shoal in lat.  $11^{\circ} 23'$  N., long.  $101^{\circ} 47'$  E.

**CAMBODIA or CAMÃO POINT**, the south-western extreme of Cambodia, is low and covered with trees, and cannot be seen farther than about 9 miles from the deck of a small vessel. The edge of the bank off the point is very steep-to, the sounding decreasing at once from 8 to 2 fathoms, which latter depth will be found at the distance of 2 miles off shore.\*

Abreast Pulo Obi the edge of the bank is fully 5 miles off shore; it is very steep also to the eastward along its southern edge, and as several rocks have been found within the 5 fathoms line, it will be prudent when passing not to go into less than 8 fathoms water.

To the northward of Camão point the soundings are regular, and the coast may be approached with safety.

**Camão River**.—From Cambodia point the land trends in an E.N.E. direction 17 miles to Camão river entrance, which is nearly dry at low water. Excepting the scattered huts of a few solitary fishermen, no signs of inhabitants were seen near it.

**The Coast** from Camão river trends in a northerly direction 53 miles to abreast Pulo Dâmã, the land between being all low, with the

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\* See Admiralty chart:—Gulf of Siam, sheet 5, No. 2,723; scale,  $m = 0.25$  of an inch.

exception of the Paps, two small rocky bluffs, elevated 100 feet, on the coast line, bearing N.  $\frac{1}{2}$  E. 34 miles from Cambodia point.

**False Pulo Obi**, bearing N.N.W.  $\frac{3}{4}$  W. 23 miles from Cambodia point, is three-quarters of a mile long, half a mile broad, elevated 500 feet with cliffy sides and steep to all round. At 4 miles S.S.E.  $\frac{1}{2}$  E. from False Pulo Obi is a small rocky island, elevated 167 feet, with a ledge of rocks projecting a quarter of a mile from its east side. The channel between these two islands is safe; and there is a safe channel 12 miles wide between them and the main.

**Pulo Dāmā** situated N. by W.  $\frac{1}{2}$  W. 43 miles from False Pulo Obi, is  $3\frac{1}{2}$  miles long, North and South, one mile broad having near its centre a sharp peak, elevated 1,077 feet. Three small islands lie off its north point, and several off its south-east end; no dangers were found westward of the island farther than half a mile.

**Tammassou** is a high table island, elevated 1,390 feet, with steep cliffy sides, bearing about E.N.E. 16 miles from Pulo Dāmā. The island is safe of approach in every direction. Fresh water was found on it, but only in small quantities, and very inconveniently situated for embarkation.

**Teeksou Island**, N.E.  $\frac{1}{2}$  E. 13 miles from Tammasou, is of conical form, and elevated 1,380 feet. There is no passage for vessels to the eastward of this island. A large estuary was seen from the *Saracen* in this direction, where it is said there is a town of considerable trade; but it was not examined.

**Teksia Peak** is a cone of 810 feet elevation, bearing N.N.E. 7 miles from Teeksou, and remarkable as the first high land on the main seen on approaching from the southward. Between this peak and Teeksou there is an anchorage for large trading junks, their cargoes are brought out from the neighbouring town in the flat boats of the country.

**TABLE HEAD** is a rocky headland elevated 600 feet, bearing W. by N. 15 miles from Teksia point. The coast between forms a deep sandy bay, having several small rivers falling into it. This bay is very shoal; and a dangerous rock, awash, lies S.E.  $\frac{1}{4}$  S.  $4\frac{1}{2}$  miles from table head. Just within Table head to the northward there are some remarkably rocky hills.

**Tekere or Minghue**, a cone-shaped island, elevated 1,120 feet, and bearing S.W.  $\frac{3}{4}$  S. 8 miles from Table head, is the largest of an archipelago of islands and rocks that extend westward and south-westward from Table head. There are two islets, named Outer island and Shark island, to the south-westward of Tekere; and there is one also called West island, lying about midway between Tekere and Pulo Cici or the Twins, in the fair way channel, for vessels approaching Cancao from the southward.

**CANCAO RIVER**\* has on either side of its entrance high bluffs, which, together with the gap dividing them, are remarkable from the westward; and from this direction the town of Hatien, which stands at the entrance, may be seen at the distance of 6 or 7 miles.

There is a large fort in front of the town to seaward to defend the entrance of the river. This river communicates by a canal with the great Cambodian river Makiang, and is the route by which the produce of the interior is brought down to the coast. Some native boatmen assured a French missionary resident at Kamput that there is a 13 feet channel into the Cancao river. Mr. Richards only found 7 feet at high water, but he did not make a thorough survey of the bar owing to his not wishing to risk a collision with the authorities of the place. Government boats were sent out to warn the *Saracen* off, but it was done with civility. The fort occasionally fires on merchant vessels passing near.

The anchorage off the town is good, and the soundings regular. In working up to it from West island, care should be taken not to make too free with the islands on either hand; many of them being surrounded by dangerous rocks.

As no European vessel is allowed to anchor off Cancao, they are obliged to rendezvous at Kamput, to which anchorage their cargoes are conveyed in Cancao junks.

Between Cancao and Kep point, 10 miles to the north-westward, the coast is only navigable for junks. There is no safe passage for vessels inside the Pirate islands; the *Saracen* grounded twice in making the attempt.

**Anchorage.**—Mr. Brown, commanding the English brig *Acis*, January 1860, recommends the following anchorages to vessels bound to Cancao, the approaches to which are marked on the chart. That eastward of Great Pirate island will be most useful to vessels trading with Cancao in the south-west monsoon. The anchorage eastward of North Pirate island may also be of service to vessels of light draught in the same monsoon, and so may that under the south side of Peaked island in the north-east monsoon; but the channels leading to the two latter anchorages will be found rather intricate. Mr. Brown reports a  $2\frac{1}{2}$ -fathoms shoal extending  $2\frac{1}{2}$  miles W. by N. from North Pirate island: and he farther states that he found a  $4\frac{1}{2}$ -fathoms channel between Ragged rock and the nearest Pirate island, where  $2\frac{3}{4}$  and  $3\frac{1}{4}$  fathoms are marked on the chart; but he does not give any data for fixing their position or reducing them to low water.

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\* The entrance of this river belongs to the French, having been ceded to that government by the King of Cambodia.



The anchorage on the east side of Great Pirate is in  $4\frac{1}{2}$  fathoms, anchoring East or N.E. of the island according to the wind. That on the east side of North Pirate is in  $4\frac{1}{2}$  fathoms with the island bearing West, distant 2 miles.

The anchorage under the south side of Peaked island is stated to be the best in the north-east monsoon for vessels that have sometimes to receive cargo both from Kamput and Cancao. The *Acis* anchored in 3 fathoms about a quarter of a mile from the centre of a little sandy beach. Teher was a depth of 6 fathoms about 2 cables south-westward of her, with the centre and highest part of the island bearing N.E., the water gradually deepening to it, and then gradually shoaling to 3 fathoms outside it. A vessel of large draught should approach this anchorage from the westward, by the main channel about 3 miles west of the Pirate islands. The south-west point of Peaked island is low, and rocks extend a cable from it; excellent water can be obtained on both shores of the island, and there is a variety and an abundance of timber.

**East and West Brother** are two small islands, 473 and 406 feet respectively in height, lying off the south point of Koh Tron. They bear nearly E.N.E. and W.S.W. from each other, and are 3 miles apart. There are three rocks to the south-westward of the West Brother; the outermost, which is the largest and named Table rock, forms a rocky table about 20 feet high, and lies S.W.  $1\frac{1}{4}$  miles from the West Brother.

**KOH TRON**, named by the natives Koh Dud, is of a triangular form, 26 miles long, North and South, and 14 miles broad, near the north end. The north-east side of Koh Tron is composed of table land, elevated about 1,600 feet, southward of which is a remarkable quoin-shaped hill; and at the south end of the island there are some remarkable conical hills and bluffs. There are also some hills of moderate height near the north-west point; the remainder of the island is low. The eastern shore is dangerous to approach, being fringed with coral reefs and sunken rocks, but the island is clear of danger in every other direction. Fresh-water streams abound, especially along the eastern shore.\*

There are a great variety of wild animals on Koh Tron, among which tigers, deer, and pigs are said to abound. There are several villages, the chief of which is on the western shore of the island, about midway between its south and north-west points; it is the seat of government of the island, and ruled by the Cochin Chinese, several of whose war junks were at anchor off the village. The people would not reciprocate friendly advances, nor would they sell any stock.

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\* See Admiralty plan of Koh Tron and channels leading to the anchorages off Kamput, No. 2,725; scale,  $m = 0.5$  of an inch.

The passages are generally safe between the group of islands and rocks extending 7 miles to the southward from the south point of Koh Tron, and there is a safe channel, 5 miles broad, between them and the Brothers.

**Directions for South Channel to Kamput.**—The Brothers, with Pulo Dāmā, are the chief guides when bound to Kamput from the southward. Vessels intending to take the South channel to Kamput may, if necessary, pass northward of the Brothers, but they should not approach Round Hill point (the south point of Koh Tron) nearer than 3 miles, as a rocky ridge with  $2\frac{1}{2}$  fathoms on it extends E.S.E.  $2\frac{1}{2}$  miles from the point.

The eastern shore of Koh Tron, particularly from abreast Pulo Cici to its north point, is very dangerous. Between these points the island is bordered with a rocky irregular one-fathom bank, extending occasionally 3 miles from the island: along its steep edge the water is deep, and attention to this fact is the best way of avoiding the danger.

In standing towards the Koh Tron shore always tack when the soundings deepen suddenly. Pulo Cici, or the Twins, are two small islets covered with trees, and connected together by a reef of rocks; the northern islet is 213 feet high. A vessel may pass at a mile on either side of them.

The water is rather shoal between Pulo Cici and South Pirate island, but the soundings are regular and the bottom sandy.

**Caution.**—Between Koh Tron and Pulo Cici lies the Rosita rock, on which an English schooner of that name struck. It is of coral, 100 yards in diameter, with 2 feet water, and steep-to on all sides, but may be seen at a short distance from aloft by the discoloured water. From Rosita rock the high Twin bears S.E. by E.  $4\frac{3}{4}$  miles; South Pirate island E.  $\frac{3}{4}$  S.; Gunung Susu, or Paps, 300 feet high (about a mile north of Bumbi bluff), N.  $\frac{1}{2}$  W.; and Byoot peak, 1,608 feet high (near the north-east point of Koh Tron), N.W. by W.  $\frac{3}{4}$  W. westerly.

In passing between Pulo Cici and Rosita rock there is no particular guide available. Between the rock and Koh Tron the soundings given in the chart will be the best guide. A good mark to lead down towards the west side of the rock from the anchorage at Kamput is Bumbi cone, in line with Bumbi bluff; but both the cone and the bluff will be lost sight of before arriving abreast the rock; this latter mark leads to the anchorage off Kamput.

**North channel to Kamput.**—For all large vessels, the channel northward of Koh Tron is recommended, as the water is deep and the soundings regular. Caution should be used in standing towards the edge of the north bank near the western entrance of the Kamput river,

as it is steep-to and rocky. The ground is also foul at the north point of Koh Tron. A number of large rocks 20 feet high extend about 2 cables from the point, having others near them under water.

The western entrance of the North channel between Water island and Koh Tron is  $2\frac{1}{4}$  miles wide, but there is a large Flat rock just within it, and lying North half a mile from the north-west point of Koh Tron; and a rocky island covered with trees lies W. by S.  $1\frac{1}{2}$  miles from the same point. There are also two other small rocky islands to the southward of the entrance.

In passing through this channel, vessels should not if possible pass inside Flat rock or any of the above small islands, as the ground is foul between them and Koh Tron, and the set of the tides irregular.

**Anchorage.**—The anchorage off Kamput is in 4 fathoms, with Bumbi cone in line with the Paps, N  $\frac{1}{4}$  W., and Kep peak E.  $\frac{3}{4}$  S.

Good anchorage will be found on the north-west side of Water island in 4 fathoms water, at a quarter of a mile from the shore; and all vessels intending to remain any length of time at Kamput would do well to anchor here and complete their water. The watering place is in a sandy bay on the north-west side of the island; there is a fine running stream, and as the beach is very steep, the water is easily embarked. This bay is also a good place to haul the seine.

**Supplies.**—Bullocks, pigs, fowls, ducks, and eggs were purchased very cheap. Of vegetables there were great variety, and the market had a good supply of fruit. Wood was plentiful; water can be obtained from wells near the town, but it is muddy and bad, and procured with great difficulty.

**Tides.**—It is high water, full and change, at Rocky island (which lies about 5 miles S.S.E. of the entrance of Kamput river, and  $1\frac{1}{2}$  miles westward of Temple island) at 4 h. 0 m., springs rise about 4 feet. The highest tide took place on the day of the new moon. The streams here, as in most other parts of the gulf, run for 12 hours near the full and change, subject to great and unaccountable irregularities.

**Bay Island,** 380 feet high, situated 11 miles W. by N.  $\frac{1}{4}$  N. from Water island, is  $2\frac{1}{2}$  miles long N.W. by N. and S. E. by S., and  $1\frac{1}{2}$  miles broad; three small rocky islands lie to the westward of it, and one just within it to the eastward. There is a narrow ship channel between these islands and the main land.

**Kapongsom River.**—From Bay island the coast trends to the northward towards the estuary of the Kapongsom river, which is 13 miles wide, and, as far as it was examined, safe. The deep water appeared to be along the southern shore. The land on both sides is low near the coast,

rising gradually to an elevation of 500 feet, and then falling again inland. There are a few small villages scattered along the shores of this estuary.

**RONG SAM LEM**, the southernmost of a chain of islands that front the estuary of the Kapongsom, is 5 miles long, North and South, elevated 780 feet, and its shores are steep and quite safe of approach. Saracen bay, on the north-east side of this island, almost divides it into two parts, and affords good anchorage for large vessels. Wood and fresh water may be obtained in abundance at the head of the bay, but owing to the shallow water, it is difficult to embark. A more convenient watering place will be found just without the bay to the northward, where the beach is steep-to. There are tigers on the island, besides deer and a great number of pigs.

Between Rong Sam Lem and the nearest point of the main, a distance of 9 miles across, may be considered the best entrance into the estuary of the Kapongsom. This space is broken into several channels by Mangrove and Elbow islands, Square rock and some patches of 4 to 5 fathoms. The largest and best channel is 3 miles wide, between the  $4\frac{1}{2}$  fathoms patch off the north-east part of Rong Sam Lem and the reef off the west point of Mangrove.

**Koh Rong**, lying  $2\frac{1}{4}$  miles northward of Rong Sam Lem, is 8 miles long, N.W. and S.E., and 5 broad. The greater portion of the northern end of this island consists of table land, the highest part of which elevated 1,158 feet, descends with a slope to the southward, and rises again near the southern extreme, where it terminates in a sharp peak. Its shores are generally steep and foul, offering no advantages to vessels anchoring in its neighbourhood.

There are no inhabitants on any of these islands.

The channel between Koh Rong and Rang Sam Lem is safe, although generally rocky ground and unfit for anchorage. The passage northward of Koh Rong is divided into four channels by small islands. Vessels passing through are recommended to use either the channel near Koh Rong, or that near Samit point. The channel eastward of the islands is believed to be clear of danger, with the exception of a dangerous rocky bank of only 9 feet water, lying East 2 miles from the north-east point of Koh Rong.

**Koh Samit**,  $1\frac{1}{2}$  miles long, one mile broad, and elevated 400 feet, is the southernmost and largest of a chain of islands and rocks that front the coast for 12 miles northward of Samit point. There is a deep-water channel east of these islands, and, as far as the examination went, the passages between them are also safe.

Between Samit point and Koh Kong, 23 miles to the northward, the land is hilly near the coast, forming rocky bluffs to seaward, with sandy

bays between. These bays have generally deep water in them, and afford good anchorage. The highest and most remarkable hill about this part is elevated 1,155 feet, and is named the Quoin, from its peculiar wedge form.

**Kusrovie Rock**, in lat.  $11^{\circ} 6' 25''$  N., long.  $102^{\circ} 47' 49''$  E., and distant about 17 miles from the nearest part of this coast, is about 150 yards in diameter and 36 feet high, without a particle of vegetation on it. Its sides are shelving, and isolated rocks extend half a cable from it. The bottom can be plainly seen in 6 fathoms near this rock.

The commander of the Netherlands India barque *Ellen Bangka*, 12th November 1870, reports that his vessel, whilst in the neighbourhood of Kusrovie rock, struck twice on a shoal on which there was only 11 feet water.

The vessel was at that time North, 5 or 6 miles from Kusrovie rock, which was visible from the deck. The danger has accordingly been placed in lat.  $11^{\circ} 11'$  N., and long.  $102^{\circ} 47'$  E.

**Koh Kong** is a level table island, 11 miles long, North and South, 4 miles wide, and elevated 1,500 feet. It has some sandy beaches along its western shore, which is steep-to and safe of approach, but the island offers no sheltered anchorages or other advantages to shipping. There are no inhabitants.

Within Koh Kong there is a large shallow bay into which numerous small rivers disembogue; but they are generally unapproachable excepting in the flat-bottom boats of the country. The channel into this bay lies close along the eastern shore of the island; it is narrow and has only 9 feet at low water.

The main land within Koh Kong is very low as far as visible to the eastward, but it rises to the northward with great regularity until it joins the high table land abreast Koh Kut.

Two rivers of considerable magnitude enter the sea a short distance northward of Koh Kong; the northernmost river, named Klong Koh Kong, may be known by a remarkable mound, elevated 400 feet, forming a bluff on the coast line, and bearing N.N.W. 2 miles from its entrance, and N. by W.  $\frac{1}{2}$  W. 11 miles from the north point of Koh Kong. The edge of the shoal bank off these rivers is very steep and  $2\frac{1}{2}$  miles from the shore. There are not more than 3 feet on the bar of the Klong Koh Kong at low water.

**The COAST**, from the Klong Koh Kong, trends in a N.N.W.  $\frac{1}{2}$  W. direction 40 miles to Tung Yai bay, with regular soundings, and is safe to approach. With the exception of two rocky bluffs, the land near the sea is low, and fringed by a straight sandy beach pierced by numerous small streams; but parallel to the coast, at the distance of 2 or 3 miles inland, a

table land rises with great regularity to the height of more than 2,000 feet. This mountain mass rises at the distance of a few miles north-east of Tung Yai river, and falls again at the Klong Koh Kong; one of its highest points was found to be elevated 4,000 feet. The channel between the main land and Koh Kut is quite clear, with regular soundings.

Tung Yai bay affords good anchorage, but the eastern shore must be approached with caution, as several rocks lie nearly a mile off it. A small stream, the Tung Yai river, falls into the head of the bay, but it is only navigable for boats. There is a scattered village and much cultivated ground about 7 miles from the entrance of the river, but the natives stated that the town of Tung Yai stands a short distance inland from the left bank. On the western shore of the bay there are some small scattered villages, and much uncultivated ground. The natives were shy and suspicious at first, but afterwards civil and obliging.

Lem Nam, forming the western point of entrance of Tung Yai bay, makes like a low woody island from the southward. From thence the coast takes a W.N.W. direction 20 miles to Lem Ling or Junk point, and is fronted all the way by an extensive flat, named Tung Yai bank, which extends off for a short distance southward from Lem Nam, but more than half way across from the main land towards the centre of Koh Chang, and near its middle is a small clump of black rocks 5 feet high.

A small mangrove islet lies close to Lem Ling, and the ground is foul for some distance off it, and also for more than a mile along the shore to the northward; but Lem Ling is quite clear to the south-west. The channel between it and Koh Chang is 3 miles wide, and safe; but there is a rock, elevated 4 feet above the sea, lying S.E. by S. 2 miles from Lem Ling; and dangers have been reported on the Tung Yai shore, well out in channel, farther to the eastward. The deep water in the channel lies on the Koh Chang shore, and as the edge of the Tung Yai bank is rocky it must be approached with caution.

**Koh Kut**, lying 16 miles off the coast between the parallels of  $11^{\circ} 34'$  and  $11^{\circ} 46'$ , is a high level island with steep cliffy sides. There are two small conical peaks near its south end, the highest of which (the northern) is elevated 1,171 feet. The island has no permanent inhabitants.

Good anchorage will be found in a bay near the north-west end of Koh Kut, with a stream of fresh water running into it. Fresh water may also be obtained on the eastern side of the island, about a mile from its north point.

**Koh Mak**, lying 3 miles north-west of Koh Kut, and S.S.E. 7 miles from Koh Chang, is 3 miles in diameter, and very low, excepting at its west end, which presents a rocky head to seaward, elevated 300 feet.

It is inhabited by fishermen engaged in collecting bêche-de-mer. There is a broad and safe channel between the archipelago of islands south of Koh Chang and Koh Mak ; there is also a good channel between Koh Mak and Koh Kut.

**Koh Chang**, situated  $7\frac{1}{2}$  miles north of Koh Mak, is 16 miles long, N.W. and S.E., and 6 miles broad, having several peaked hills intersected by rocky and precipitous ravines. The highest part of the island (a table peak near its centre) is elevated 2,446 feet. Notwithstanding the numerous islands and rocks that fringe Koh Chang, no dangers were discovered near its shores but what were apparent. There is a native government station at a low jutting point on its eastern side, with about 20 persons, who are the only inhabitants. Tigers are said to be numerous.

Fresh water can be obtained on the western side of Koh Chang, about 3 miles from the north point.\*

**The COAST** from Lem Ling trends N.W.  $\frac{1}{4}$  N. 21 miles to Lem Sing, which forms the western side of entrance to the Chentabun river. The shore between is low mangrove; but a short distance from it and 5 miles from Lem Sing, are three small high islands. There is also a large river at the distance of 6 miles northward of Lem Ling, the entrance to which is easily known by two small high islands lying immediately off it.

**Alabaster Rocks**, in lat.  $12^{\circ} 20' N.$ , long.  $102^{\circ} 1\frac{1}{4}' E.$   $7\frac{1}{2}$  miles S. by W. from the entrance of the Chentabun river, were examined, and their positions determined by Mr. Alabaster, of H.M. Consulate, Bangkok, who describes them as two small rocks, about 40 feet apart, lying N. by E. and S. by W. from each other. The southern and larger one is, at low water spring tides, about 14 feet long by 5 broad, and 3 feet above the surface of the sea; the northern one is smaller and shows but 2 feet above water. The rocks rise perpendicularly from a depth of 2 fathoms; in the passage between them are  $2\frac{1}{4}$  fathoms at low tides. For about 200 feet all around there is rocky bottom, with soundings to 4 fathoms, outside those depths the bottom is sand, with soundings gradually increasing to 9 fathoms. In a N. by W. direction from the rocks the rocky bottom extends farther, about 500 or 600 feet, where sand commences at a depth of  $7\frac{1}{2}$  fathoms. Fishermen say they can trace a line of rocky bottom from thence to Cone island.

From the Alabaster rocks Cone island bears N.  $\frac{1}{4}$  W.—westerly; the

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\* Some of the old manuscript charts show a sunken rock midway between the Kusrovie rock and the south point of Koh Kut; and another 24 miles West of the north point of Koh Chang. The *Saracen* passed over these positions without meeting any token of their existence, but caution is recommended to all vessels passing their neighbourhood.

summit of Khảo Sábáp mountain, N.E.  $\frac{3}{4}$  N.; the southernmost of three small islands N.E. by E.  $\frac{1}{4}$  E.; and Table peak, the highest part of Koh Chang, S.E.

**Reported Rock.**—The *Allom Prah*, on her voyage from Saigon to Bangkok, saw a rock in lat.  $12^{\circ} 25\frac{1}{2}'$  N., long.  $101^{\circ} 39\frac{1}{2}'$  E., which position was determined by bearings.\*

**CHENTABUN RIVER.**—The position of this river may be recognised from a distance by Khảo Sábáp, a mountain, which rises to an elevation of 2090 feet N.E. by E. 9 miles from its entrance; also by Lem Sing, which at a distance appears like an island, and by a conical islet, named Cone island, 405 feet high, lying a mile westward of it, as well as by a remarkable white cliff on its eastern face.†

The eastern side of entrance begins at Koh Chula or Bar island, between which and Lem Sing is the channel into the river with 13 feet at low water, but as it is only a quarter of a mile wide it would be necessary to warp a large vessel in against a head wind. Vessels can ascend the river as far as the fork, which is within 10 miles of the town. Above the fork, the river is shallow and difficult to navigate even by the small junks of the country. There are two forts (in ruins), one on each side the river entrance, and a small village, called Paknam, just within the fort on the left bank.

A convenient anchorage may be obtained without the bar, with Koh Chula bearing N.E. by E. distant about half a mile. Fresh stock is scarce, but an abundance of good water may be procured in a small bay westward of Lem Sing.

**Tides.**—It is high water, full and change, at the entrance of the Chentabun at 10 h. 0 m., springs rise  $5\frac{1}{2}$  feet. The highest tide took place on the day after the change. Here, as in the Bangkok river, the streams run for twelve hours at the full and change, and are subject to great irregularity.

**Koh Samit**, 377 feet high, bears W.N.W. 52 miles from the north end of Koh Chang. It lies off Lem Ya, from which it is separated by a channel named Chong Samit,  $1\frac{1}{2}$  miles wide, with a depth in it of 3 fathoms.

Mr. Alabaster reports that the native pilots declare a rock exists in Chong Samit, towards the western end of the straight, about mid channel; their directions for avoiding it are:—"If, on entering the strait from the westward, Koh Plateen is sighted, stand over close to the main land ;

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\* Mer de Chine (p. 156) ; the bearings are not given.

† See Admiralty plan of Chentabun river on gulf of Siam, sheet 3, No. 2,721 ; scale  $m = 0.25$  of an inch.



if Koh P'lateen is not sighted, keep as near as possible to the island." Mr. Alabaster searched for this rock unsuccessfully; he nevertheless believes it to exist.

Off the south point of Koh Samit there is a rocky islet, named Tree island, and two large rocks; the outer, or Brown rock, lies S.S.E.  $4\frac{1}{2}$  miles from Lem Ya.

**LEM YA** may be known by a clump of conical hills extending from it 15 miles inland; the highest, which is the northernmost, is elevated 2,470 feet. On each side of this headland the coast is low. The bay to the westward is slightly concave, and fringed with a sandy beach to Lem Sāhemsan, or cape Liant. The bay to the eastward has several small islands in it.

Mr. Alabaster also reports that the native pilots say a rock, named Hin-ai-eorp, lies in about  $12^{\circ} 35\frac{1}{2}'$  N., long.  $101^{\circ} 46\frac{1}{2}'$  E., in a direct line between the island of Mon-Klang and the small bay on the main named Tung Kaben, about 5 miles distant from the latter. Some pilots say that it is visible at all states of the tide, others that half tides cover it.

**CAPE LIANT or Lem Sāhemsan.**—On approaching this cape from the southward, the outer islands off it, Chuen and Me-san, being the highest land in the neighbourhood, will be first seen. Hin Chalan, in lat.  $12^{\circ} 27' 46''$  N., long.  $100^{\circ} 58' 29''$  E., will not be observed until it is within the distance of 5 miles; it is a white rock 40 feet high, 200 yards in diameter, steep-to, and safe to approach.\*

The channel between Hin Chalan and Chuen is  $2\frac{1}{2}$  miles wide, and quite clear. The channel between Chuen and Me-san is a mile wide; and there is also a channel between cape Liant and Koh Riat, but it is only a quarter of a mile wide, and although much used by small vessels, is dangerous during spring tides, and certainly should never be attempted by a sailing vessel without a fair and commanding breeze. All these channels seem to be clear of danger.

**Sheltered Bay**, at 3 miles north-westward of of cape Liant, is about 4 miles wide and 2 deep, with good anchorage in about 3 fathoms water, sheltered by several small islands fronting its entrance; Koh Yoh, the outer island, is of conical formation. The eastern horn of this bay may be known by a remarkable cone 454 feet in height. A vessel might be beached or hove down with safety inside Koh Pra. There are a few inhabited huts on the northern shore of the bay, but neither stock or fresh water can be procured.

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\* See Admiralty chart: Gulf of Siam, sheet 2, No. 2,720; scale,  $m = 0.31$  of an inch.

**Tung Kitea Bay.**—Lem Putau, the north-west point of Sheltered bay, is a bold bluff headland 600 feet high, close round which to the northward, is Tung Kitea bay. Fresh water can be obtained in the south-east corner of this bay, but in other respects it is an undesirable anchorage.

**Tung Plong Bay** lies one mile northward of Tung Kitea, and being sheltered by Koh Kram and Koh Irá, offers secure anchorage to vessels detained in the channel.

Koh Irá lies nearly a mile off the southern horn of this bay; its south and east sides are fringed with reefs; at 2 cables north-eastward of this island, there is a dangerous reef; it will therefore be advisable to keep near the eastern shore of the channel which is steep and safe.

A remarkable rock, named Sombrero, lies three-quarters of a mile from the south-east side of Koh Kram, and the channel between it and Koh Irá is about a mile wide. Sombrero should not be approached closely to the northward, as there is much foul ground for a considerable distance in that direction.

**KOH KRAM**, lying 9 miles north-westward of cape Liant, is 3 miles long, north and south, and 2 miles wide. There is a remarkable sharp peak 704 feet high on its south-east side, and a bay on its north-west side; its western shores are quite safe to approach, but reefs extend three-quarters of a mile from its eastern, and half a mile from its southern shores.

**KOH LÜEM or PILOT ISLAND**, situated N.N.W.  $\frac{1}{2}$  W. 16 miles from the north-west point of Koh Kram, is three-quarters of a mile long, north and south, and half a mile broad, steep-to on the south and west sides, and rises from the sea bold and cliffy, its peak of a dome-like appearance, and 445 feet high, being in lat.  $12^{\circ} 57\frac{1}{2}'$  N., long.  $100^{\circ} 38' 59''$  E. A shoal with  $2\frac{1}{2}$  to 4 fathoms, and 8 to 13 fathoms close to, extends 2 miles in a northerly direction from Koh Lüem. This island from its conspicuous and peculiar position, has long been considered the principal landmark at the head of the gulf; all vessels bound to Bangkok river make it, take their departure from it, and run boldly for the anchorage off the bar by day or night.

Koh Lüem is the northernmost of a chain of small islands, named Koh Rin, Kring Badung, Mana Mechy, and the comparatively large Koh Pai, which is 2 miles long and one mile broad. The channels between all these islands are free from danger.

**Koh Lán**, lying E. by S.  $7\frac{1}{4}$  miles from Koh Lüem, is  $2\frac{1}{2}$  miles long, a mile broad, and has a remarkable sharp peak, elevated 685 feet. On its eastern side is a village; the chief employment of the inhabitants seems to consist in cultivating large fields of plantains, which appear to be the

principal produce of the island. A small island, named North Lán, lies half a mile from its north end, and another, East Lán, a mile from its north-east side.

**The COAST** between Tung Plong bay and Koh Klet-këo, 4 miles to the northward, is composed of high rocky bluffs, with sandy bays between. At  $3\frac{1}{4}$  miles N.W. of Klet-këo there is a remarkable cliffy rock, 40 feet high, with a few trees on its summit.

Lem Patáya, situated N.  $\frac{1}{4}$  E. 9 miles from Klet-këo, and E. by S.  $2\frac{3}{4}$  miles from East Lán, the small island off the east side of Koh Lán, presents a number of low rocky bluffs to seaward, having at a short distance to the eastward, a hill 370 feet high. Between Klet-këo and Lem Patáya is a deep bay with low land. One mile E. by S. of East Lán there is a rocky bank about 200 yards in extent, with 3 feet on it, which narrows the channel between it and Lem Patáya to  $1\frac{1}{2}$  miles.

From Lem Patáya, Lem Kwan bears N.N.E.  $\frac{1}{2}$  E. distant  $3\frac{1}{2}$  miles, and Lem Kra-bang N.  $\frac{1}{4}$  E.  $9\frac{1}{4}$  miles. One mile north of Lem Patáya is a low rocky islet 200 yards in diameter. Between Lem Patáya and Lem Kra-bang the land is low, and forms a bay about  $3\frac{1}{2}$  miles deep. At Lem Kra-bang commences a range of hills which borders the coast for 8 miles to the northward, thence extending inland joins the Bang-pasoi mountains.

From Lem Kra-bang to Si-ma-ha-ra-cha and Bang Pra, the hills approaching the shore form a number of small rocky points with sandy bays between.

**KOH SI-CHANG.**—At 4 miles W.N.W. of Lem Kra-bang commences the Koh Si-chang group, between which and the coast there is a clear channel. Koh Si-chang, the largest of the group, is  $3\frac{1}{4}$  miles long, North and South, one mile broad, its peak, which rises at the north end of the island to an elevation of 697 feet, bears N.E. by N.  $15\frac{1}{2}$  miles from Koh Lüem. Kangku, an island with a sharp peak 325 feet high, lies one-third of a mile off the south end of Koh Si-chang, and a rock 10 feet high, about two-thirds of a mile off the north end; an island also, named Koh Kam, and three islets, lie off the north-east side; the western side is quite clear. At half a mile E. by N. from the rock 10-feet high, is a rock with only 4 feet water on it; and there is another with 3 feet N.N.W. one-third of a mile from the north point of Koh Kam.

The bay on the north-east side of Koh Si-chang affords anchorage partly sheltered by Koh Kam and the islets to the eastward. The best berth is between the inner or sandy point of Koh Kam and the village on Koh Si-chang, or rather nearer Koh Kam.

The village on the south shore of this bay probably contains about 200 inhabitants (1857), who appear less shy of foreigners than the natives of

the coast to the southward. There are two streams of fresh water here, one empties itself into the sea just southward of the village, the other at the north point of the bay, but as both depend on the rain for their supplies, are frequently empty in the dry season ; on these occasions the inhabitants resort to their store of water jars, which are always kept full for emergencies of this nature. When all the streams are full much time will be saved by watering here, but the anchorage possesses no other advantages that are not exceeded at Si-ma-ha-ra-cha. A few fowls and vegetables may be purchased.

**SI-MA-HA-RA-CHA.\***—Koh Si-ma-ha-ra-cha is a rocky islet about 90 feet high, lying about a third of a mile from the coast, N.N.E.  $\frac{1}{4}$  E.  $6\frac{1}{2}$  miles from Lem Kra-bang, and East  $6\frac{1}{2}$  miles from the north point of Koh Si-chang. The town of Si-ma-ha-ra-cha stands on the shore about S.E. half a mile from the islet, and contains 500 inhabitants (1857) ; and the town of Bang Pra, about three miles to the northward, has about 1,000 inhabitants (1857). The latter town cannot be approached nearer than 2 miles by a vessel of large draught.

With Si-ma-ha-ra-cha islet bearing E. by N. half a mile, in  $3\frac{1}{4}$  fathoms at low water, or for a large vessel a quarter of a mile farther out on the same line of bearing in 4 fathoms, is apparently the best anchorage at the head of the gulf, for communicating with the shore, for it is better sheltered than any other part.

**Supplies.**—Fresh water is abundant on shore when the springs elsewhere are dry, and the towns of Si-ma-ha-ra-cha and Bank Pra could furnish large quantities of fresh stock. At the distances of half and three-quarters of a mile southward of Bang Pra are two fine streams of water that run into the sea through the beach, and the natives say that they are never dry, even in the hottest seasons. A boat might fill from these streams at high water, but at low tide the sands dry out so far that they could not be approached within half a mile.

The *Saracen* watered from a spring about half a mile inland from Si-ma-ha-ra-cha. The water was brought down to the beach in buffalo carts, which appear to be numerous, and contain three jars of 24 gallons each. There was no difficulty in procuring six tons in a day, at the rate of 90 cents per ton, or two shillings per cart.

The country in the neighbourhood could supply everything a vessel would require in the shape of refreshments, and game of every description abounds. The soil is good, and the vicinity of the Bang-pasoi hills, rising to an altitude of 2,300 feet, would afford a retreat from the summer

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\* Si, beautiful ; maha, great ; racha, royal, in Pali.

heats, and render this spot an admirable position for an European settlement.

Between cape Liant and this watering place the coast is very thinly inhabited. There are no streams of fresh water near the sea; the natives appear to depend chiefly on rain water, which is collected by bamboo spouts, fixed to the roofs of the houses, and stored in large earthen jars, of which a large number are to be found in every village.

**Bang-Pasoi.**—From Si-ma-ha-ra-cha the coast curves round to the northward, and at the distance of 8 miles is Double Head,\* a prominent bluff rising from the low land to the height of 270 feet, and appearing at a distance like an island. At 2 miles north-eastward of Double Head stands the village of Anhin (a royal watering place), and 4 miles E.N.E. of Anhin, in the depths of a shoal muddy bight, is the large town of Bank-pasoi, a place of considerable importance. The town is governed by a high noble, and has a good market, but unfortunately it is only accessible from the sea at high water, in consequence of an extensive mud flat, which dries out in front of it nearly a mile at low water. Immediately at the back of the town there is a small range of hills of about 400 feet elevation, which is the last of the high land on this side the gulf.

**BANG-PA-KONG RIVER** empties itself into the gulf at 5 miles northward of Bang-pasoi, and appears to be navigable for small vessels as far as Prachin a distance of 104 miles from the entrance. An extensive mud flat with tolerably even depths fronts the mouth of this river. The channel is marked by red beacons on the west, and white beacons on the east side.

**Tides.**—It is high water, full and change at Bang-pa-kong entrance, at 6 h. 30 m.; springs rise 10 feet.

**ME-NAM CHAU-PHYA or BANGKOK RIVER** has on the western point of entrance a clump of high trees like a small mound elevated about 30 feet above the surrounding mangrove, in lat.  $13^{\circ} 32' N.$ , long.  $100^{\circ} 35' 13'' E.$ , and this is the first land seen on approaching from the southward. From this mound Pilot island or Koh Luem bears S.  $\frac{3}{4}$  E.  $34\frac{1}{2}$  miles; Double Head S.E. by E.  $22\frac{1}{2}$  miles; and Koh Si-chang peak S.E. by S. 25 miles.†

The river is deep and free from shoals for a distance of 60 miles. At about 3 miles within the entrance, on the eastern bank, is Paknam, where vessels must anchor to discharge guns and ammunition, and take on board a custom-house officer. Here is a fair market, from which vessels

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\* The native name is Lem Samook, the Nose point.

† See Admiralty plan of Mé-nám Chau-Phya or Bangkok river, No. 999; scale  $m = 1.8$  inches.

remaining at the bar anchorage can obtain their daily supplies of fresh food, but it is considered better to send to Bangkok for stock for a voyage.

Paklat Lang, on the western bank of the river, 5 miles above Paknam, is the entrance to a canal which saves a circuit of nearly 10 miles to boats proceeding to or from Bangkok : vessels must take the circuitous route by the river. The entrance is marked by a guard-house on each side, and its vicinity may be known by a long range of batteries half a mile above on the same side of the river. The canal re-enters the river alongside some floating houses at the small village of Paklat Bon.

Navigating Lieutenant A. Fane, H.M.S. *Juno*, remarks that this canal is frequently closed, and was so in the month of March 1877.

**BANGKOK**, the capital and seat of trade of Siam, is about 25 miles from the sea, following the river course, or about 14 miles direct. The first important objects seen, in approaching the city, are the American consulate on the west, Puddicombe's ship-building yard, and Russell and Co.'s godowns on the east. Above these are some handsome temples, the French consulate and cathedral, the custom-house, British and Portuguese consulates, and the godowns of some English merchants, all on the east bank ; the only conspicuous object on the other side being a fort nearly opposite the British consulate. Beyond this the river on either bank is lined with floating houses, over which can be seen thick clusters of wooden houses built on piles, and several magnificent temples. The second creek above the British consulate leads to the Sampeng bazaar, an extensive and well-supplied market. Farther on is the walled city, on the east bank ; and in the opposite suburb are some European stores and lodging-houses, the palaces of the Pra-klang and Kalahome, the old British factory, palace of the Kromma Luang, several European merchants' residences, and some temples, one of them a lofty pyramidal building, above which vessels seldom anchor.

In the city are many temples conspicuous for beauty. The palaces of their Majesties the First and Second Kings are extensive buildings, with a long river frontage furnished with elegant and commodious landing stages for royal use. Floating houses continue for 3 or 4 miles above the First King's palace, with few interruptions. The population of Bangkok is estimated at 300,000 (1856). There is a weekly communication between Bangkok and Singapore.

**Docks.**—There is a dock at Bangkok 300 feet long, 100 broad at entrance, with 15 feet water over sill at ordinary spring tides. The entrance is 40 yards from the river, with a spacious jetty, alongside which vessels can be taken at any state of the tides. There are also several mud docks.

**The Bar** of the river has its outer edge 5 miles southward of the west point of entrance; the shoalest part is about a mile over north and south, and when the river is at the lowest level, which is in the month of April, it has only 3 feet on it at low water springs. The inner part of the bar commences at about one third of a mile southward of the fishing stakes. The channel into the river is between extensive banks of sand and mud, which dry off a considerable distance from both shores. The west bank dries at low water—the native pilots usually mark its edge with bamboos, but they are frequently displaced. The east bank dries at very low tides, but shoals gradually from the channel.

Four junks laden with stones were some years ago sunk across the mouth of the river (it is reported by the Siamese during a war with the Cambodians). The junks decaying, these stones have become a solid mass by the accumulation of sand and mud.\* There is a depth of 5 feet at low water on these stones, which are marked by a buoy with a white top; from this buoy the centre of the southern clump of trees on West point bears W.S.W. Vessels can pass the buoy on either side at a distance of about 8 yards.

**Light.**—From a screw-pile lighthouse on the bar of Bangkok river, a *fixed* white light is exhibited at an elevation of 44 feet, visible in clear weather from a distance of 10 miles.

**Pilots.**—Pilot boats having European pilots on board, cruise between Koh Lüem and the bar of Bangkok river. There is generally a pilot boat at anchor outside the bar.

The pilot flag is red and white horizontal.

**Anchorage.**—During the north-east monsoon the best anchorage off the bar is in  $3\frac{1}{2}$  to 4 fathoms, with the lighthouse bearing about N.W. by N.; and during the south-west monsoon in  $3\frac{1}{2}$  to  $4\frac{1}{2}$  fathoms, with the lighthouse N. by E.

**Directions.**—Entering Bangkok river, West point should be brought to bear N.  $\frac{1}{2}$  E., and steered for on that bearing until the lighthouse bears N.N.E.  $\frac{1}{2}$  E., when a N. by E.  $\frac{1}{2}$  E. course will lead between the sets of fishing stakes (3 sets on each side, pointing to the south-west) and about a third of a mile westward of the lighthouse; thence steer N.E.  $\frac{1}{2}$  N. until the lighthouse bears S.S.W., when a N.N.E. course should be steered for about half a mile, or until West point bears N.W.; a vessel may then steer N. by W.  $\frac{1}{2}$  W. for the centre of the mouth of the river, keeping a little towards the eastern shore to avoid the flats which extend from West point. A mid-channel course may then be steered to Bangkok city, being careful to avoid the shoals extending from East point.

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\* Mr. S. Spry, Second Master, H.M.S. *Beagle*, 1862.

Mr. J. Phillips, Master, H.M.S. *Vigilant*, remarks that after passing the fishing stakes the bottom becomes very hard on approaching the eastern bank, and very soft on nearing the western bank; this is the principal guide to the pilots. It should be remembered that the flood tide sets strong to the north-westward, or across the channel.

**CAUTION.**—Approaching the bar of Bangkok river from the southward in the north-east monsoon, it will be necessary when near the head of the gulf to allow for a westerly current which occasionally runs with great strength along the edge of the bank, and vessels set to leeward by it have found considerable difficulty in regaining the anchorage. For this reason boats working out of the river should not attempt to cross the bar before they can make sure of fetching their vessels.

During this monsoon the land in the vicinity of Bangkok river is generally obscured by smoke, and the lighthouse, which can be seen in clear weather before the land is made, is the only mark to show the entrance of the river.

As pilots are always available, it is recommended that no vessel should cross the bar of Bangkok river without local knowledge.

**Tides.**—From the following observations taken at the anchorage off the bar of Bangkok river, it will be seen that the tides near the entrance are very irregular :—

|                        |         |                     | h.m. |    | ft.      |
|------------------------|---------|---------------------|------|----|----------|
| February 5th, New Moon | H.W.    | 8.00 a.m.           | Rise | 11 | springs. |
|                        | 1st Qr. | " 8.00 "            | " "  | 9  | neaps.   |
| April 5th, New Moon    | "       | 4.30 "              | " "  | 8½ | springs. |
| " 11th, 1st Qr.        | "       | 7.00 "              | " "  | 7½ | neaps.   |
| " 12th, Full Moon      | "       | 5.30 "              | " "  | 7½ | springs. |
| " 27th, Last Qr.       | "       | midn <sup>t</sup> . | " "  | 8½ | neaps.   |

At and near the springs there were only two tides in 24 hours, and four tides at neaps. These irregularities caused by the gradual change from one to the other, are occasionally increased and confused by changes of wind in the gulf.

In the month of April the river is at its lowest level, and the tide observations during this month gave 3 feet on the bar at low water springs, and 10½ feet at high water. Towards the end of the rainy season (the beginning of October) the river is much swollen, and its banks are frequently flooded and the country inundated. The bar has then 5 feet on it, at low water springs, and 14 and 15 feet at high water, and the water is said to be quite fresh at low tide.

The soundings on the Admiralty chart are reduced to the lowest level on the bar observed in the month of April.

Outside the bar and near the anchorage the flood sets to the westward,



and the ebb to the eastward, altering its direction occasionally according to the strength of the river stream. Along the eastern shore of the gulf towards cape Liant the ebb sets to the southward and flood to the northward.

It is high water at cape Liant, about the same time as at the bar of the Bangkok, and the rise is only  $6\frac{1}{2}$  feet.

**TACHIN RIVER**, situated about 20 miles westward of Bangkok river, was navigated by H.M.S. *Teazer*, in November 1871, as far as Maconchisi in latitude  $13^{\circ} 39'$  N., and longitude  $100^{\circ} 11'$  E., nearly 35 miles from the mouth. Tachin river has a similar bar to Bangkok river, but the entrance is more difficult to distinguish, the land in the neighbourhood being low, and covered with trees.

In clear weather the high land of Bang-pasoi brought to bear E. by S. will lead to a position off the bar, which may be crossed on a N.N.W. course. Tachin river has about the same general depth and width as Bangkok river.

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## CHAPTER XVI.

## COAST OF COCHIN CHINA.—CAMBODIA POINT TO THE HUÉ RIVER.\*

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 VARIATION, 2° East in 1879.
 

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**The COAST** of Cambodia, or Lower Cochin China, from Cambodia, or Camão point, its south-western extreme, to the Saïgon river, is very low land, inundated by the sea at times; and in most parts the trees are just discerned nearly level with the water's edge, from the deck of a large ship, at the distance of 11 or 12 miles. The whole coast is fronted with shoal banks of sand, which project 10 or 12 miles from it in some places, having  $2\frac{1}{4}$  and 3 fathoms on them, and 6 to 7 fathoms near their edges. The sounding are regular in the offing, and decrease gradually until the edges of these banks are approached; then from 9 or 8 fathoms, the water shoals suddenly in some places: the bottom near the edges, and also a considerable distance seaward, is mostly fine sand and ooze.\*

As the coast here is very low and destitute of any particular mark, it must be approached tolerably close to observe its bearing, but this must be done with great caution; when its trend changes from eastward to north-eastward, the entrance of the Cambodia river will be abreast.

**Royalist Bank.**—The late Lieut. D. M. Gordon, of H.M. surveying vessel *Royalist*, sounded on a bank, about S.E. by E., 24 miles from Pulo Obi, which he thus describes:—"On 15th January 1848 we discovered a bank having 17 fathoms water at each end; and crossing it in a S.S.E. direction, we continued in from 10 to 6 fathoms, sand and hard bottom, for about  $1\frac{1}{4}$  miles, where we again deepened to 17 fathoms. Pulo Obi was occasionally in sight through the haze, but no correct bearing could be obtained. I could not see the bottom, and am not positive that it was coral the lead only bringing up reddish sand. We made it in lat.  $8^{\circ} 12\frac{1}{2}'$  N. long.  $105^{\circ} 11\frac{1}{2}'$  E."

There is another patch of 6 fathoms upon the Admiralty chart, about E. by  $\frac{1}{2}$  N., 20 miles from the Royalist bank.

**The CAMBODIA RIVER,**† which forms on the west the limits of French Cochin China, is of great commercial importance. Taking its

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\* See Admiralty chart of China sea, southern portion, No. 2,660\*.

† The account of this river is principally a translation from the *Mer de Chine*, compiled by M. A. Le Gras, Capitaine de frégate, French Imperial Navy, 1865.

source in the mountains of Thibet, it traverses two of the south-western provinces of China, and passing along the entire western frontier of the Annamite empire, enters Cambodia, where it divides into three branches or arms, two of which flow through lower Cochin China, and are there known as the rivers Hau-kiang and Tien-kiang.\*

The division takes place near Pnum-penh, or Nam Van, the ancient capital of Cambodia, in about lat.  $11^{\circ} 40' N.$ , long.  $104^{\circ} 55' E.$  The first branch turns to the north-westward, and passing Oudon, the present residence of the King of Cambodia, goes to supply a large lake, nearly 60 miles in extent, the lower part of which is in lat.  $12^{\circ} 30' N.$ , long.  $104^{\circ} 27' E.$ , about 200 miles from the sea, and the upper part in lat.  $13^{\circ} 10' N.$ , long.  $103^{\circ} 42' E.$  The head of the lake is in the kingdom of Siam, and 6 or 7 miles up a small river are the very extensive ruins of the ancient city of Angkor.

The second branch is the Hau-kiang, the western of the two large rivers running through lower Cochin China. It takes from Nam Van a S.S.E. direction, watering the provinces of An-giang and Vinh-long of which it forms the western limit. At the city of An-giang or Chau-doc in lat.  $10^{\circ} 43' N.$ , long.  $105^{\circ} 5' E.$ , it communicates with the gulf of Siam at Hatien (Cancao) by the canal Vin-thé, a great part of which is the work of man, and a few miles lower down it is joined to the Tien-kiang river by the canal Vam-nao; from thence it follows a south-easterly direction, discharging itself into the sea by the mouths Cua Ba-tac and Cua Din-nan.

The third branch is the Tien-kiang, the eastern of the two rivers which flow through lower Cochin China. From Nam Van it makes its way towards the sea parallel to the course of the Hau-kiang, and bounding the province of Mitho (Dinh Tuong) on the west, separates the French and Annamite provinces. At Vinh Long, in lat.  $10^{\circ} 17' N.$ , long.  $105^{\circ} 48' E.$ , a branch, named the Co-khien, diverges from the main stream, and falls into the sea by two mouths, named Cua Cong-hau and Cua Co-khien. A few miles farther to the eastward two other rivers, the Ham-long and the Ba-lai, branch off from the main stream; the mouth of the first is named the Ben-nhaû, that of the second the Ba-lai. The main stream flows on past the city of Mitho, and finally disembogues by two mouths named Cua-dai and Cua-tieu.

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\* The Cambodia river has been hitherto generally known as the Mé-kong or Mé-kiang, but on the latest French charts, constructed from the surveys of M. Manen, the main branch of the river above Nam Van is named Toanlé-Thom, Song long, or Cuu Long-kiang, (Great river); the branch leading to the great lake is named Song, Di-bien, or Toanlé-Sap, (Sweet-water river).

This great river, the surveys of which are the result of the labours of M. Manen and other French hydrographic engineers, is navigable for a great distance into the interior. The waters commence to rise in the month of May, attain their maximum in October, and decrease until March. They rise 26 to 33 feet at Nam Van, and 17 feet about Chau-doc and the Rach Ong Nu. Tides are only felt during the season when the waters are low, and their height is 10 inches at Nam Van, and nearly  $4\frac{1}{2}$  feet at Chau-doc.

**Delta of the Cambodia River.**—The several mouths of the Cambodia river form a delta more than 60 miles in extent, in a N.E. and S.W. direction. The land is low, and subject to frequent changes in consequence of the accumulation of the rich alluvial deposit brought down by the different branches of the river.\* Shoal banks front the whole delta, and extend so far to seaward that the land is nearly always invisible from their outer edges. The 5-fathoms line of soundings bounding these banks passes about 30 miles westward of Pulo Condore, about 12 miles east of the Cok-hien mouth, and about 3 miles east of the Cua-tieu mouth. Between the extreme mouths of the river, from lat.  $9^{\circ} 20'$  to  $10^{\circ}$  N., lies the most advanced part of the coast, and it is in front of this part that the bank projects farthest. The soundings near its edge decrease suddenly from 10 or 11 to 3 fathoms, and the land, which is here 7 or 8 miles distant, is generally invisible.

Many vessels have gone on shore in this locality, on account of the rapid decrease of the soundings and the absence of any land-marks. It is therefore necessary in approaching this coast from the offing to exercise extreme prudence, and the greatest possible caution should be observed when navigating to the westward of the line of cape St. James bearing

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\* We have not here entered into a description of the numerous rivers and streams which in every direction intersect the interior of lower Cochin China; such would be out of place in this work. Some of them are quite deep enough for the passage of gun boats, and all, or nearly all, are navigable for the native craft by which the commerce of the country is carried on; the following are the most important:—The river Ben Luc (Vaico, eastern branch), which runs from the north to the south, parallel to the Saigon arm of the Don-nai, is deep, and easily navigated. The river Vung-ngu, (Vaico, western branch), which runs parallel to the lower part of the Cambodia river, and joins the Vaico, eastern branch. The Great Commercial canal which unites Mitho to the western branch of the Vaico river and to Saigon, and also to the numerous affluents of the Don-nai, of which the Rach Tra is the most important. The Commercial canal which connects the Cambodia river with lower Cochin China and the Don-nai. The canal d'Avalanche, which is immediately to the northward of Saigon. The Rach-mongom, the Rach-tach-bai, and the Rach-ba-bon, which afford easy means of communication between Saigon and Baria; and the Don-kiang, the Tay-kiang, &c. which connect Saigon with Bien-hoa, &c.—*Mer de Chine*, page 205.

N. by E.  $\frac{1}{2}$  E. At the first cast under 11 fathoms, or as soon as trees become visible, it is necessary to haul out quickly to the eastward, especially during the north-east monsoon, when the current set strong on to the banks to the south-westward. The direction of these currents vary from West, S.W., and S.S.W., and their rate, which depends a great deal upon the force of the wind, is sometimef as much as 40 or 50 miles in 24 hours. Near the mouths of the Cambodia river the rate of the current increases with the flood and diminishes with the ebb.

The waters of the Cambodia are charged with yellowish mud, and discoloured water may at times be seen 7 or 8 miles out at sea towards the end of the ebb, but it is driven back by the flood. This change of colour indicates the approach to shoal water, and is therefore a limit which it is not prudent to pass.

The formation of deposit is so rapid in these parts, that the limits which we have given may perhaps be altered in a few years. There is so much sea on the edges of these banks, and the currents which set towards the land are so strong, that this coast should be absolutely avoided during the north-east monsoon.

The mouths Ba-tac and Din-an, which limit to the westward the delta of the Cambodia river, bear N.N.W.  $\frac{1}{2}$  W., and are distant 45 miles from Pulo Condore. The shoal banks fronting them extend about 9 or 10 miles, and are for the most part uncovered at low water. The bar at the entrance of the former has not been completely sounded; upon that of the Din-an there are 8 feet at low water spring tides.

The mouths Cong-hau and Co-khien are about 20 miles farther to the north-eastward; the shoal banks fronting them extend 10 or 11 miles, and partly uncover; upon the bar fronting these entrances there are but 6 feet water, low spring tides. There is a clump of trees on the right bank of the Cong-hau, and a fort on the right bank at the entrance of the Co-khien.

The Ben-nhau mouth, 7 or 8 miles farther to the north-eastward, appears to be more accessible; from 8 to 10 feet was found upon the bar at low water springs, but the channel is long, tortuous, and difficult. Two forts, one upon each point of the entrance, defend it.

A few miles farther to the north-eastward is the entrance of the Ba-lai, upon the bar of which 9 or 10 feet was found at low water spring tides.

The Cua-dai and the Cua-tieu, the two northernmost mouths of the Cambodia river, are defended by forts built upon the banks at their entrances. On the bar of the former but 5 or 6 feet was found, and on that of the latter 6 or 7 feet, at low water springs. The shoal banks, near

which it is necessary to pass in entering these mouths, are numerous and extensive, the shallow water covering them forming large plateaux of very dangerous breakers.

In the actual state of things it would be useless to give instructions for entering these different mouths, the banks and channels being subject to change of position ; the coast, moreover, is very low, and covered with a vegetation so uniform, that in all probability any bearings we might give here would but have the effect of leading into error. None of these mouths are therefore practicable, in our opinion, unless they be first carefully buoyed, or unless with the assistance of a local pilot.

**DELTA of SAÏGON or DON-NAI RIVER.**\*—At 6 miles to the eastward of the Dongtranh mouth lies Cangio point, which limits on the west the bay of Ganh Ray, into which flows the Don-nai, as well as the Viam-tcheou, the Viam-kai-mep, the Ba-bou, the Tchavia, and the Rach-lap.

**CAUTION.**—In front of the mouths Cua-dai and Cua-tieu, and to the south-eastward of Cangio point, the banks are the most numerous and extensive, and as they limit on the west the channel leading to Saïgon, it is necessary to be extremely careful that the vessel is not drifted towards them by currents.

When the vessel is abreast of the Cua-dai mouth, or about 15 miles distant from the light on cape St. James, take care that the light is not brought to the eastward of N.E.  $\frac{3}{4}$  N., upon which bearing at that distance it leads in 4 fathoms about  $2\frac{1}{2}$  miles outside the dangerous banks and breakers at the entrance of the river. From thence that bearing of the light appears to be a prudent tacking mark when standing towards the banks fronting the shore ; it is however possible, when distant from 5 to 7 miles from cape St. James, to stand farther to the westward, until the light bears N.E.  $\frac{1}{4}$  E., but it is considered advisable not to do so, especially in large vessels.

**SAÏGON or DON-NAI RIVER.**—The Phuoc-binh-kiang, commonly called the Don-nai, or Saïgon river, has not been explored higher up than the cascades, situated about 25 miles above Bien-hoa, the chief town of a province of that name, and which lies 12 miles to the N.E. by N. Saïgon. Nothing in the nature of the mountains of lower Cochin China indicates the existence of what might be its proper sources, and it is probable that its waters are replenished by the inundations from the great river of Cambodia. It irrigates all the northern part of the

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\* See Admiralty chart :—Saïgon or Don-nai river, No. 1,269 ; scale  $m=0\cdot6$  of an inch.

province of Bien-hoa, passes before the citadel of that name, and pursues its course to the southward. It does not become navigable until below the ancient barriers, at the point where the Tay-giang branches off, 6 miles below Bien-hoa. From thence it follows a south-easterly direction for 3 or 4 miles, and then trends with several windings to the south-westward until it receives the Saigon arm and forms the Tam-kiang-khau, which runs nearly north and south. At Phami point it divides into two arms; the one turning to the westward is the Loirap, that turning to the south-eastward reassumes the name of the Phuoc-binh-giang or Don-nai. Four or five miles below the point at which the Loirap diverges, a smaller branch, named Rach-mon-gom, turns to the eastward; this separates into two streams, both of which rejoin the main river at one point, and form that part known as the Quatre-bras.\* The Don-nai disembogues at Cangio point in Ganh Ray bay, 8 miles below Quatre-bras.

The Saigon arm of the Don-nai is its sole affluent, and, like it, is replenished by the inundations from the great river of Cambodia. It flows from the N.W. to the S.E., leaves on its right the mountain of Badinh, passes by the Cai-cong, Thu-dau-môt, and Dai-thieu, and, pursuing a very serpentine course, passes Saigon, joining the Don-nai about 8 or 9 miles below that city.

**The Tchavia and Rach-lap** rivers are at the eastern part of Ganh Ray bay, opposite Cangio point; they lead to the town of Baria. The Rach-lap is preferable; the depths in it being not less than 2 fathoms at low water spring tides. It is necessary in any case to anchor outside the narrow channel which leads from both rivers to the town, and which is only navigable for boats. The Rach-lap uniting itself to the Cua-lap completely isolates the peninsula of cape St. James.

**CAPE ST. JAMES**, bearing from Pulo Condore about N. by E.  $\frac{1}{4}$  E. distant 98 miles, and forming the eastern boundary of the entrance to the Don-nai or Saigon river, is the first high land seen when coming from the south-westward, the whole of the coast from thence to the gulf of Siam being very low swampy land. The mountain forming the cape has at its southern part a low gap, and on its northern part a high gap, which give it the appearance of three islands when first seen at a distance of about 30 miles, but on a near approach the connexion is perceived. The extreme of the cape is a narrow tongue projecting to the southward, and at a short distance to the eastward of it is a small islet.

The village of Vang-tau stands in Cocoa Nut bay on the western side of cape St. James, about  $1\frac{1}{2}$  miles from its south extreme. The bay is

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\* Four arms: see points G, H, I, and J, on Chart of the Saigon or Don-nai river, No. 1,269; scale,  $m = \text{half an inch}$ .

about a mile long and half a mile deep, the beach being lined by a grove of cocoa-nut trees. The shore between the extreme of the cape and the bay is bold, and may be passed at half a mile with safety; but the bay is shallow and affords anchorage only for vessels of the smallest class. At the southern part of the bay the soundings decrease pretty regularly from 5 to 3 and 2 fathoms, but at the northern part they decrease suddenly from 5 to  $1\frac{3}{4}$  fathoms; vessels, therefore, intending to anchor off this bay should approach it with caution, and anchor in 7 or 6 fathoms; the bottom is soft mud, and the holding ground good. “\* Be careful not to drop the anchor on a sunken wreck in 7 fathoms of water; the extreme south-west point of the bay bearing S.E. by E., and the north-west point N.N. by E.”

**Water.**—Good water may be obtained from wells, easy of access, at the village of Vang-tau; water may also be found at a village in the Ganh Ray river, a short distance from the point marked A. in the chart.

**Lights.**—From a tower, 26 feet high, standing on the southernmost of the heights of cape St. James, and 776 yards within the south extreme of the cape, a *fixed white* light is exhibited at an elevation of 482 feet above the sea, and is visible in clear weather at about 28 miles.

A *fixed white* light, elevated 32 feet above the sea, and visible 10 miles, is exhibited from a light vessel moored head and stern N.W. and S.E., in 5 fathoms water, close to the right or west bank of Saigon river N.W.  $\frac{1}{2}$  W., distant  $2\frac{1}{2}$  miles from Cangio point.

**Cangio or Bassok Bank**, forming the western boundary of the entrance to the Don-nai river, is very extensive, and has but 3 to 4 feet water over it at low tides. From its southern extreme, in 2 fathoms, the lighthouse on cape St. James bears E. by N.—northerly,  $4\frac{3}{4}$  miles, but shoal soundings of 3 and  $3\frac{1}{4}$  fathoms extend from thence to a  $2\frac{1}{2}$  fathoms patch, which lies S.W., from  $3\frac{1}{4}$  to 4 miles of the lighthouse. The edge of the bank from the southern extreme in 2 fathoms, take a north-easterly direction till abreast of Vang-tau, where it trends to the northward as far as abreast of point A, where the navigable channel is about  $1\frac{1}{2}$  miles broad; from thence the bank curves away gradually towards Cangio point, passing it nearly three quarters of a mile off.

The edge of the Cangio bank may generally be known by rows of fishing stakes, the extremes of which are usually close to the deep water; these stakes, however, cannot be depended upon for marks, being occasionally shifted by the natives.

**Shoal Banks at the Entrance.**—The shoal patch, lying about

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\* Remarks by Mr. A. J. Loftus, commanding the ship *Kensington*, of Singapore, in Naut. Mag. December, 1862.



2½ miles south-east of the 2 fathoms' extreme of the Cangio bank, is a hard bank of sand and gravel about half a mile in extent, with 13 to 15 feet water over it. From its north-eastern extreme the lighthouse on cape St. James bears N.E. by E., distant 3 miles. Between the shoal patch and the Cangio bank, the depths are 3 and 3½ fathoms; 3½ and 4 fathoms extend a mile to the eastward of it, and irregular soundings of 3½, 5½, and 4 fathoms, about 1½ miles to the north-eastward; from thence to cape St. James the depths are 6 to 8 fathoms.

The Formosa bank, the west extreme of which lies S.E. by E., three-quarters of a mile from the south point of cape St. James, is a mile in extent E. by N. and W. by S., and composed of hard sand and gravel, with but 13 to 15 feet water over it. About a mile E.N.E. from it is a patch of 3 fathoms about half a mile in extent.

Two miles S.S.E. from cape St. James there are shoal patches of 4¾ fathoms on a bank of irregular soundings, which extends from thence, about E. by N., nearly 3 miles. Between this bank and the Formosa bank and 3 fathoms patch, are depths of 6 fathoms, and 6 to 7 fathoms in other directions from it.

The Formosa bank, and the shoal patches to the southward and eastward of it, will be avoided if the lighthouse be not brought to bear westward of N. by W.

**The Channel** at the entrance forms an elbow to Cangio point, the first land met with on the left hand when entering. It is 10 miles long, and between the north point of Cocoa Nut bay and the Cangio bank, 2 miles broad, but gradually narrows to three-quarters of a mile abreast of Cangio point, where the river is usually considered to begin. The channel is bounded on the west and south by the Cangio bank, on the east by the cape land, and a mud bank which extends about 2 miles from the east side of Ganh Ray bay, and on the north by a mud bank which extends nearly 2 miles to the eastward of the land opposite Cangio point: these mud banks are separated by a passage with 5 to 8 fathoms water in it. The bottom of the channel is soft mud; the general depths are 7 to 12 fathoms, and ships may anchor in any part of it.

The entrance of the river at Cangio point cannot be made out when distant, the land being very low, and covered with brushwood. The best mark is a remarkably small clump of trees of moderate height, on Cangio point (B.); they are best seen from Cocoa Nut bay. The trees at Cangio form an excellent mark for the entrance of the river.

**Cangio** is a small fishing village on the right bank of the river, not far from Cangio point, but it was, in 1862, nearly deserted on account of the numerous pirates in the river.

**Supplies.**—Sometimes a few fish, ducks, pigs, eggs, and a small supply of vegetables may be bought at the village, at moderate prices. The native boats are numerous here, and sail very fast, with two and sometimes three triangular sails made of matting, and if wanted, may be hired for a small sum to go to Saïgon or elsewhere.

**Banks and dangers in the river.**—Banks extend from both sides of the river between Cangio point (B.) and the points marked E. and F., considerably narrowing the channel, which must there be navigated with caution; the soundings are irregular, and the banks shoal suddenly. The river from thence to point P. is free from danger with the exception of a bank extending from the right bank north of point L.; a bank projecting a short distance from point M., another from the point opposite N., another from point O., and another immediately above point Q., contracting the channel considerably between that and point R.

**Coral banks.**—There is a coral bank, with 6 to 12 feet water, in the bend opposite point P., which extends more than half-way across the river. There is also a detached bank with 6 feet water over it between the southern part of the shore bank, and the shore just to the southward of point P.

**Beacons** have been placed on the left bank of the river for leading clear of the coral banks.

The two northernmost beacons (outer white, inner red) in line lead through the west channel; the two beacons next south (both white) lead through the east channel; and the two southernmost beacons (outer white, inner red), in line lead between the shore bank and the bank extending from point P.

A shoal bank projects some distance from the shore at point S. at the junction of the Loirap, to avoid which vessels going up should keep towards the left bank or eastern side of the river.

**Dangerous bank** commences nearly  $1\frac{1}{2}$  miles above point T., and extends about  $3\frac{1}{2}$  miles along the bank on the eastern side of the river, from which it is separated by a narrow channel of 3 fathoms. It reaches about half way across the river, and is composed of sand and rock, the latter prevailing at its south end; it is also coated with mud and clay. Several vessels have been much injured on this bank, and have experienced great difficulty in getting off it. When working up or down this reach, tack just before getting in mid river, and never shoal the water under 6 fathoms.\*

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\* The ship *Kensington*, drawing 20 feet water, with a pilot on board, grounded and remained on this bank three days; she was got off with much difficulty after discharging upwards of 4,000 bags of rice, &c.—*Mr. Loftus*.

Dangerous bank extends to abreast of point V., where the river turns sharply from a N.N.E. to a W.S.W. direction; from thence to Saïgon the river is free from danger.

**The CITY of SAÏGON** stands on the right or west bank of the Don-nai, about 45 miles from cape St. James. It was formerly the principal arsenal and marine dépôt of the king of Cochin-China, who, in 1790, caused it to be extensively and strongly fortified by Colonel V. Olivier, a French officer in his service. The Portuguese have carried on a constant trade from Macao to this place for many years; and some English vessels have endeavoured to trade here and at other ports of Cochin China, but without advantage. Whilst Saïgon remained in the hands of the Cochin-Chinese, no square rigged vessels were allowed to enter, but the Chinese merchants of Singapore were in the habit of trading there in large junk rigged vessels, navigated by native crews. Saïgon is now the capital of the French possessions in Cochin China, and has recently undergone considerable alterations. The ruins of the old fortifications have entirely disappeared, and a new citadel has been built. Broad streets and canals have been carried through the principal parts of the town, whilst about two-thirds of the frontage on the Don-nai is now occupied by government establishments.

The city is situated between two small rivers, the southern one of which is named Viam-Benghé or Arroyo Chinois (the Chinese bazaar), the principal centre of trade being about  $2\frac{1}{2}$  miles up this river, and the northern one is named Tin-ghé or Arroyo d'Avalanche; their distance apart is about  $1\frac{1}{4}$  miles.

The business part of the city extends from the Viam-Benghé, nearly a third of the distance to the Tin-ghé, where is the principal landing place, a straight road from which leads to the observatory\* and the residences of the governor and principal officers, situated on some rising ground nearly half a mile from the river. Above the landing place and road just mentioned, along the bank, are the commissariat stores, artillery ground, and dockyard, the latter extending to the Tin-ghé river. At the back of the commissariat stores and artillery ground are the hospitals, and still farther back, nearly half a mile from the river, is the citidel, a large square fortification with a bastion at each quarter; the length of each face from bastion to bastion is about 330 yards.

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\* The position of the observatory is, according to the latest French charts, published in 1867, in lat.  $10^{\circ} 46' 40''$  N., long.  $106^{\circ} 43' 24''$  E. The observations obtained in 1863 in H.M.S. *Rifleman* agree very closely with this position, viz., lat.  $10^{\circ} 46' 43''$  N., long.  $106^{\circ} 42' 36''$  E.

**Docks.**—There is a floating dock at Saïgon, 300 feet long, 70 feet broad at entrance, with 26 feet water over sill. There is also a gunboat dock.

Repairs to machinery can be effected at the foundry.

**Anchorage.**—The anchorage for vessels of war is off the city in 5 to 7 fathoms; merchant vessels are obliged to anchor below the mouth of the Viam-Benghé. Ships' papers must be shown to the harbour master on arrival, and a berth for mooring ship will be pointed out by him.

**Supplies.\***—Water is obtained from a well at the Chinese bazaar on the Viam-Binghé; it is brought alongside in boats. The fish are small and black, and inferior eating. Ducks and fowls sell for about three dollars per dozen; vegetables are scarce. There is but a limited quantity of ships' stores, and little variety for visitors.

A plentiful supply of beef was obtained here by H.M.S. *Rifleman*, and also snipe at moderate prices.

**Mails.**—A mail steam vessel calls at Saïgon once a fortnight on the passage to Hong-Kong and Singapore.

**Telegraph.**—There is a sub-marine telegraph between Saïgon, Singapore, and Hong-Kong.

**Climate.**—During the day the heat is very great, the thermometer often rising to 100° in the shade, and during the night also the air is very close and the heat oppressive.

Few strangers escape from what is called the Saïgon fever; it seems to be of a chronic form, and is not easily got rid of: emetics, purgatives, and large doses of quinine, are used for its cure. Attacks of cholera and sun stroke are also frequent. Bathing, moderate exercise in the shade, spare regular diet, and ample rest, are the best preventives. Exposure to the sun, indolence, costiveness, irregular diet, and drinking fermented liquors must be avoided.

**Winds.**—In December, January, February, and March, the moonsoon at cape St. James is steady and strong, with dry hot weather; it then gradually abates in strength until it ceases. The land and sea breezes then become steady, generally blowing from E.N.E., and sometimes from N.E. during the night, and drawing round to the eastward in the morning; the sea breeze then generally sets in from S.E. towards noon, or early in the afternoon.\*

In the river, with fine weather during the north-east monsoon, it falls calm during the night, and in the morning a light breeze springs up from the N.E., which freshens as the day advances, veering through east, and in the afternoon blowing from the S.E. It blows very fresh during the day,

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\* Mr. Loftus.

moderates towards evening, and falls at night. In the south-west monsoon the winds are variable between West and S.W.

The sea breeze blows fresh up the river, gradually dying away in the evening.

**Tides.**—It is high water full and change at cape St. James, at 2 h. 30 m.\*; at Cangio point at 3 h. Upon the bars of all the Cambodia rivers, as far as the mouth of the Ben-nhau, it is high water nearly at the same time as at Cangio. Equinoctial springs rise 13 feet, neaps 9 feet. Spring tides run strong; ebb tides last longer than the floods. Neap tides are feeble and irregular; sometimes strong currents set into the river at that period, and raise the height of the tides a little. On the Coral bank up the river it is high water at 3 h. 50 m.; and the rise is the same. At Saïgon the tides are tolerably strong and regular about the springs; it is high water at 4 h. 30 m., and the rise is 11 to 12 feet.

“†Neaps are weak and irregular, with strong under currents and very little rise and fall. From the pitch of the cape the flood sets to the Cangio bank, almost direct to the mouth of the river; the ebb takes the opposite direction. The passage up the river generally occupies two days.”

**Pilots.**—Pilotage for Saïgon river is compulsory whether a pilot be received on board or not. It is advisable that foreign vessels of war should employ pilots, as they are acquainted with the buoys of the moorings at Saïgon, that have to be taken.

**DIRECTIONS.**—In the north-east monsoon vessels from the southward should make the land well to windward of the port, or they will be set quickly to leeward of cape St. James, and too near the Cangio bank, by the flood tide and the sea current setting about S.W. by W. along the coast. But a strong set in the opposite direction may be expected with the ebb tide, which at the full and change of the moon begins to run out of the river about midnight.

At about 90 miles from the coast, the wind in settled weather usually hauls to E.N.E. and East about 4 p.m., continuing all night fresh and puffy. This is the time to stand in-shore, and although as far to leeward as the meridian of cape St. James, with the ebb tide under the lee, the vessel will be to windward of cape Ti-wan in the morning.

**Entering the River,** the fairway mark is the two points of the cape land northward of Cocoa Nut bay in one, N. by W.  $\frac{1}{2}$  W.; this will lead between the shoal patches in regular soundings of 6 or 7 fathoms.

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\* Mer de Chine, p. 210. Mr. Loftus gives 11 h. as the time of high water at the cape, and 5 h. 30 m. at Saïgon.

† Mr. Loftus.

Cape Ba-ke seen just open of cape Ti-wan, bearing N.E. by E., leads to the southward of the shoal patches which lie south-eastward of cape St. James, and the lighthouse bearing N. by W. leads to the westward.

The western extreme of the north point of the cape land (A) bearing North, will lead clear of the Shoal patch on the western side of the channel, and bearing N. by E.  $\frac{1}{4}$  E. will lead between the Shoal patch and the Cangio bank in 3 fathoms least water.

When passing to leeward of the high land of cape St. James, look to the small sails as the strong puffs from it greatly endanger light masts; heavy gusts suddenly from the valley are also experienced while passing Cocoa Nut bay.

**In the South-west Monsoon**, when the east end of Pulo Condore is brought to bear South with a westerly wind and lee current, steer northward, and the vessel will soon gain the edge of the bank fronting the Cambodia rivers, and extending to the mouth of the Saïgon river.

Strong freshets run out of these rivers during this monsoon, and join the sea current, whereby vessels are obliged to keep the edge of the bank aboard to prevent being set to leeward of the meridian of cape St. James. The lead should be kept constantly going while steering along the edge of the bank, keeping in not less than 10 fathoms. Should the water begin to shoal, haul off to the eastward, when it will soon deepen as the soundings are pretty regular about here.

Continue along the edge of the bank with these soundings until cape St. James bears about N.N.E., then steering for it on that bearing, will lead to the fairway of the entrance to the river.

**Cape St. James to Saïgon.**—A steam vessel will have no difficulty in proceeding up the river, guided by the chart, by keeping as nearly as possible in mid-channel, and being careful in rounding the points. When near the Coral banks, it will be necessary to attend to the clearing marks (page 336) and when passing Dangerous bank keep to the fort side of the river. A stranger may proceed boldly up to the city as there is plenty of room to anchor and swing upon the flood tide. H.M. Ships *Rifleman* and *Vigilant* proceeded up and down the river guided by the charts and without a pilot, and did not experience the least difficulty, or find it necessary to slacken speed. It is a different matter, however, with sailing vessels, and the following directions for their guidance are by Mr. A. J. Loftus.\*

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\* Mr. Loftus made many voyages between Singapore and Saïgon, and very successfully exerted himself to render his experience useful to other navigators. His remarks were first published at Singapore, and afterwards in the *Nautical Magazine* for December 1862 and January 1863.

**In the North-east Moonsoon.**—Having rounded cape St. James at a moderate distance, either with the flood or ebb, keep mid-channel and steer for point A. until it bears East, distant three-quarters of a mile, then steer N.W.  $\frac{1}{4}$  W. till the trees on point B. bear W.  $\frac{1}{4}$  N., or the guard ship W.  $\frac{1}{2}$  N.; at the same time point A. must be brought to bear S.E. by E. Then steer W. by N. for the entrance of the river. Take care to make these courses good, attending carefully to the lead.

When turning to windward between cape St. James and Cangio point, the lead should be kept constantly going, and the water not shoaled to less than 7 fathoms on either side, the banks being steep to in many places: with a hard bottom the vessel is on the edge of the bank.

From abreast the light vessel within Cangio point proceed towards point E., keeping in mid-channel and giving the small islet lying off point D. a good berth.

When near point E.,\* brace up and luff, run close to it through the next reach. Should the wind be scant make a tack and proceed on to point J., keeping it close aboard; then brace up and luff along the south reach, giving the mouth of a river below the point a moderate berth; steer on in mid-channel until near point M., then haul up, and if the vessel be handy, work through the east reach, otherwise back and fill or drop through if the tide be strong. Make sail again at the end of the reach and proceed, rounding point O. in mid-channel, as there is a little shoal water off it. Keep close to that side of the river until point P. and the Coral bank are passed.

Having passed the bank, run on, keeping clear of the bight Q. which is shoal. When off point T., cross over to U., sailing along that side at a convenient distance. Keep close to point V. if the wind be scant, and luff through the next reach; then keep away and brace sharp up at point W., keep a close luff through the south reach, and anchor below the shipping.

**In the South-west Monsoon.**—Having arrived at cape St. James, proceed on and anchor in mid-channel off point A. if the tide be ebbing; if not, brace up and work to windward in a N.W. direction until point A. is brought to bear S.E. by E., and the group of trees on point B. W.  $\frac{1}{4}$  N., then work up for the mouth of the river on these bearings, keeping the lead constantly going and not shoaling the water under 7 fathoms.

This is the rainy reason at Saïgon, and the prevailing winds are from the West and S.W. Vessels can partly drop and sail up the river in this monsoon. But when under canvas be prepared for heavy squalls with rain

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\* Many seamen have mistaken point D. for that of E., and having luffed round it, have got aground on hard sand.

from the West and S.W., which travel across the southern part of Cambodia from the Gulf of Siam. The tides also are stronger and of longer duration now than in the N.E. monsoon.

Having arrived abreast the light vessel, proceed up the river, making short tacks, if necessary, in the upper part of this reach between points E. and D.

When standing towards either side of the river above the branch C., do not shoal the water to less than 10 fathoms; but having rounded point E., both shores are steep-to.

When close to the Four arms, the water deepens suddenly from 12 to 17 and 20 fathoms, and it would be advisable to pass these rivers under canvas, until beyond the influence of their conflicting currents, and shoaler water is met with.

In kedging or sailing past these rivers with the flood, keep in or about mid-channel, and be guarded against the tide, which sets strong from the N.W. arm into the small river below point J. Having cleared the small river at J., proceed sailing or kedging, according to the size or handiness of the ship. The flood tide at the rivers K. and L. enter the main branch, consequently ships passing their mouth will be set on the opposite shore.

Having passed point O., if under sail, it will be advisable to take it in, and kedging past the Coral bank, with the anchor under foot in the manner formerly mentioned, as it very seldom happens in this monsoon that a vessel can luff round point P. and clear the bank.

In passing this bank with a fresh wind, and flood tide, take great care to starboard the helm quickly when rounding point P., as the tide sets from that point directly into the opposite bight, and vessels from neglect of this precaution would be apt to tail on the west end of the bank. Having cleared it, proceed, and pass the mouth of the river at R. closely, as the flood tide sets out of it over to the opposite bank.

When under sail or kedging, pass point S. in mid-channel, and make directly over to U., as the flood rushes out of the river at S., and sets over to point T., sweeping the tail of the Dangerous bank. Vessels are apt to be set on the south end of this bank when kedging past, if the point of the river opposite S. be not kept close aboard.

Continue on and pass point V. close, as the greater bulk of the flood tide runs the northward, which is apt to carry vessels beyond the mouth of the smaller river, and with a head wind would lose a tide or so in getting back again. Whereas by hugging the point close, a couple of tacks will easily clear the reach, then bear away for Saigon and drop up to the shipping at leisure.

Vessels dropping up or down this part of the river should, if possible avoid the deep bight to the westward of point V., and keep close to the



opposite point, as there are some obstructions in the bottom of that bight, by which vessels have lost their anchors.

From Saïgon to Cangio point the ebb tide from the main branch enters the minor rivers and flows in a circuitous direction to the sea; whilst the flood on the contrary, empties itself into the principal stream, the small river at J. being the only exception.

**SAÏGON to CAPE ST. JAMES.**—In the North-east Monsoon the average passage of small vessels to the mouth of the river is about five days, while large vessels have taken from fifteen to twenty days. The former have the advantage of being able to work through nearly all the reaches, whilst the latter have to back and fill or kedge with the anchor under foot.

When unmooring at the city, cut the starboard anchor, keeping the port one down for kedging, and having broken ground, sheer from side to side, lying athwart the tide when convenient, and hugging the points when there is no shoal off them, to prevent being set into the bights.

After rounding point V., keep on the same side of the river as far as U., and from thence sheer direct over to point T., passing it closely, to prevent being set into the river Loirap opposite. The ebb runs very strong into its mouth, and many vessels have grounded on the soft mud bank lying off point S., through delay in crossing over. Proceed on, and when a short distance from the river R.,\* change anchors, giving that branch a good berth whilst passing, as the ebb tide sets strong into it. Having passed the bight Q. in mid-channel keep close in to that side, and look out for point P.; if the tide runs strong when that point is approached, run out a line and check the vessel round it, keeping the bushes close aboard to prevent being set on a rocky patch below the point; this precaution is necessary, particularly during the springs, as the ebb tide runs very strong, setting from point P. directly over the rocky path.

Proceed, passing point O. in mid-channel; strong sets will be found in the bight at N. and off point M., and also into the rivers L. and K., the former of which is nearly blocked up with soft mud. Vessels should hug the points opposite those rivers very closely whilst passing, otherwise they will be set into them, and meet with more or less delay.

Proceeding on, take care in passing the Four arms, as the ebb tide sets strong up the two northern arms, the water also increases in depth at their junctions, making it very unhandy for kedging, and troublesome work for the men at the windlass.

The best way to pass is to keep as close as safety will permit to the mouth of the river at J., which is rather shoal, having but 3 fathoms across

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\* Vessels dropping past the river at R. and the Coral bank should always use the starboard anchor with the ebb tide, and the port anchor with the flood. By these means the river at R. and the bank will be passed without much trouble.

its mouth. Having passed it keep close to point J., where plenty of water will be found, until beyond the tidal influence of the rivers.

Should the vessel sheer off the point, carry a line out to the trees at J., and snub her round it, otherwise she will be set into one of the northern arms, and be delayed; several vessels have been delayed from one to two days through this cause. After passing the Four arms, proceed, keeping close to point E., as the tide sets strong into the bight opposite. The channel from E. to D. is much contracted by the extent of the banks on both sides of the river.

Having passed point E., proceed in mid-channel until the small island off point D. is rounded, then keep the north shore aboard. By these means the strong set in the river C. and the extensive hard banks which lie on that shore will be avoided. These banks are steep-to, and vessels tacking or dropping in any part of this reach should borrow, if anything, towards the north shore, as the water shoals there more gradually. The lead at the same time should be kept carefully going, and very short tacks made by vessels working through the narrows at the upper part of this reach.

Having arrived at Cangio, with the sea breeze on the ebb tide, work the vessel through the channel to the eastward, being careful not to shoal the water under 7 fathoms when standing towards the banks.

When the trees on point B. bear W.  $\frac{1}{4}$  N., bring the point A. to bear S.E. by E.; work up for the point, taking care not to stand too close to the high land of St. James, as the wind is generally puffy and unsteady, causing vessels at times to miss stays. Should the tide be nearly done before getting clear of the cape it would be advisable to anchor off Cocoa Nut bay until the next ebb makes, for, should the wind fall light outside, the flood tide would in all probability set the ship on the Cangio bank.

**In the South-west Monsoon** vessels leaving Saigon will find little difficulty in getting down to cape St. James, as the prevailing winds are almost invariably favourable for most of the reaches in the river.

When large vessels cannot be worked through the smaller reaches or are obliged to kedge in consequence of foul winds, &c., the directions already given for dropping down in the north-east monsoon will be applicable. During settled weather in this monsoon the sea breeze sets in from S.W., South, S.E., and sometimes E.S.E. at cape St. James.

From Cangio work out of the bay with the ebb tide to the cape, following the directions already given for the north-east monsoon.

**CAPE TI-WAN**,\* bearing E.N.E.  $10\frac{1}{2}$  miles from cape St. James, is high, and may be seen in clear weather 40 miles off. It is the termination of a chain of hills, and is generally the first land made in coming from the

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\* See Admiralty chart:—Saigon river to Phan-rang bay, No. 1,261; scale,  $m-0.3$  of an inch.

southward. When off it, cape St. James will be seen resembling two islands of moderate height. The coast between these capes is low, and fronted with a sandy beach, near the middle of which is the entrance of the Cua-lap river, which running inland unites with Ganh Ray bay on the other side of cape St. James. Cua-lap river is only navigable by boats or small vessels drawing 6 feet water.

The bay between capes St. James and Ti-wan is filled by a shoal bank, the 3-fathoms edge of which trends in a general north-easterly direction for about 4 miles; thence W. by S. until cape Ti-wan bears N.E. by E.  $\frac{1}{2}$  E., distant 3 miles, when it approaches the cape with a curve to seaward, passing it at the distance of 2 cables; this last part of the bank is steep, the soundings decreasing suddenly from 6 to 3 fathoms.

Four miles off the entrance of Cua-lap river, with the lighthouse bearing W.  $\frac{3}{4}$  S. and cape Ti-wan N.E.  $\frac{1}{4}$  E.  $3\frac{3}{4}$  miles, is a patch with  $4\frac{1}{4}$  fathoms over it, on the end of a tongue projecting about three-quarters of a mile beyond the ordinary contour of the 5-fathoms line; close to this patch are depths of 6 and 8 fathoms. On account of the water shoaling so suddenly under a depth of 6 or 8 fathoms near these banks, and also near the Formosa bank (page 335), it is advisable for vessels passing between capes Ti-wan and St. James to avoid coming under a depth of 10 fathoms until they open the entrance of the Saigon river.

**Pernambuco Rock**, with 8 feet water and 6 to 8 fathoms close around, lies S.E.  $\frac{1}{4}$  S. 2 miles from cape Ti-wan.

**Britto Bank**, named after a Portuguese captain who was wrecked upon it, was examined by Captain Ross, I.N., in 1817, who found it to be a dangerous shoal about  $1\frac{1}{4}$  miles in length, E.N.E. and W.S.W., and its breadth does not exceed one-third of a mile. The shoalest spot has but 10 feet water over it, and consists of a large patch of rocks near the north part of the shoal, from which the summit of the highest hill over cape Ba-Ké bears W.  $\frac{1}{4}$  N. distant  $19\frac{1}{2}$  miles; Cow island N. by W.  $9\frac{3}{4}$  miles; and the islet close to Kega point N.E.  $\frac{3}{8}$  N.  $15\frac{3}{4}$  miles; there are 3 to 5 fathoms over other parts of the shoal.

Horsburgh advises vessels to keep 15 miles from the coast when abreast the Britto bank, and not to come under 16 or 17 fathoms; but at that distance from the coast, it will be sometimes difficult to see landmarks, to know when clear of the bank: vessels therefore bound from cape St. James along the coast, or those approaching it from the eastward, may proceed between the bank and the coast (page 347); but strangers ought only to do so with proper precaution in daylight.

**Otram Point**, formed of yellowish white sand hills about 120 to 150 feet high, bears N.E. by E.  $\frac{3}{4}$  E.  $12\frac{1}{2}$  miles from cape Ti-wan, the coast

between forming a bay in which there is a small river named Xich-ram or Chit-ram.

**Ba-Ké Shoals.**—Between the Xich-ram river and Otram point the shore bank stretches off nearly 2 miles, and a bank about 2 miles in extent, with 4 to 5 fathoms water over it, lies  $4\frac{1}{2}$  miles south-eastward of the entrance of the river; eastward of this bank are the Ba-Ké shoals having 9 feet to  $5\frac{1}{2}$  fathoms water over them, the outermost, with  $4\frac{1}{2}$  fathoms, lies 8 miles S.  $\frac{1}{4}$  E. from cape Ba-Ké.

These banks, from the water shoaling suddenly over a hard bottom, cause overfalls, particularly near the edge of the shore bank; but out in 10 or 11 fathoms water the bottom is generally soft, and the soundings regular. The shoals under the depth of 5 fathoms will be avoided by keeping cape Ti-wan to the northward of West, until cape Ba-Ké bears N. by W.

**Cape Ba-Ké**, bearing N.E. by E.  $\frac{3}{4}$  E.  $4\frac{1}{2}$  miles from Otram point, consists of a hill 394 feet high, and is connected with Otram point by a range of sand hills. The bay between them is encumbered by a shoal patch with less than 12 feet water over it, lying nearly 2 miles to the eastward of Otram point; by the shore bank which extends nearly a mile to the southward of cape Ba-Ké; and by the shoal banks previously described.

**Channel Inside Britto Bank.**—The soundings for 12 miles eastward of cape Ba-Ké decrease regularly towards the shore, but inside the Britto bank there are several shoal patches, only two of which, however, are dangerous except to large vessels.

The southernmost of these patches, with  $3\frac{3}{4}$  fathoms water over it, lies about 5 miles north-west of Britto bank, and 6 miles from the nearest land, which is a point bearing about N.  $\frac{1}{2}$  W. from it; the summit of the highest hill over cape Ba-Ké bearing W. by S.  $14\frac{3}{4}$  miles; and Cow island N.N.E. 7 miles. Between this patch and the outer part of the bank extending from the shore there is 7 fathoms water. At a distance of 2 miles north-westward of this patch, the water shoals suddenly to  $2\frac{1}{2}$  fathoms on the outer edge of a spit projecting to the southward nearly  $2\frac{1}{2}$  miles from the shore. From the extreme of this spit the summit of the highest hill over cape Ba-Ké bears nearly W.S.W.  $16\frac{1}{2}$  miles; the nearest land N.W.  $\frac{1}{4}$  W.  $2\frac{1}{2}$  miles; and Cow island N.E.  $\frac{1}{4}$  N.  $3\frac{3}{4}$  miles.

About  $2\frac{1}{2}$  miles south-west of the outer edge of the spit, there is a depth of  $4\frac{3}{4}$  fathoms, with 6 and 7 fathoms around it, from which the summit of cape Ba-Ké bears W. by S. nearly  $12\frac{1}{2}$  miles, and Cow island N.E.  $\frac{1}{2}$  N.  $8\frac{1}{2}$  miles.

**Directions.**—Vessels passing between Britto bank and the shore should not attempt to go inside the  $3\frac{3}{4}$  fathoms' patch, for there are no objects sufficiently near to afford safe marks for passing between it and the tail of the spit. But if desirable to do so, the summit of cape Ba-Ké bearing W.  $\frac{1}{2}$  S. until Cow island bears N.  $\frac{1}{2}$  E. will lead clear of the shoals between Britto bank and the shore, and when the isle off Kega point bears N.N.E.  $\frac{1}{2}$  E. the vessel will be to the eastward of Britto Bank.

The soundings appear, from the French chart, too irregular to afford the means of correctly judging a vessel's position; but Horsburgh remarks that the depths decrease towards Cow island and the main to 7 and 6 fathoms; and from 9 fathoms in mid-channel, they increase to 11 or 12, and usually decrease again to 9 or 10 fathoms close to the edge of the Britto shoal.

**Cow Island**, bearing N.E. by E.  $\frac{1}{2}$  E.  $19\frac{3}{4}$  miles from cape Ba-Ké is a small round island, with trees upon its summit, lying about a mile from the nearest part of the coast, and  $1\frac{1}{4}$  miles eastward of the entrance of a small river. It is safe to approach, the soundings decreasing regularly towards it.

Between cape Ba-Ké and Cow island the land is low and woody in some parts near the sea, and from the French chart it would appear that there is a range of low sand-hills on that part of the coast nearer Cow island.

**Kega Point**, bearing from Cow island E. by N.  $\frac{1}{4}$  N., distant 12 miles, is the extremity of a tongue of low land, the prolongment of a spur from mount Tai-ku, terminating in an islet which resembles from a distance a fort in ruins. In the bay between Cow island and Kega point are two small rivers; at the entrance of the western river is a village named Laghi.

The land is low and woody near the sea; inland the country is high, and the regular sloping mountain Tai-ku (Nui-tra-cau) rises to an elevation of 1,312 feet, at 9 miles N.W.  $\frac{1}{2}$  N. from Kega point. This mountain is visible a great distance from seaward, being the most conspicuous land in this part of the coast, and detached from any other high land.

The shore may be approached by the lead for a distance of 6 or 7 miles eastward of Cow island, but about  $4\frac{1}{2}$  miles W.S.W. from Kega point, and 3 miles from the shore, the water shoals suddenly from 6 or 7 to  $3\frac{1}{2}$  fathoms. W. by S. 4 miles from Kega point is a patch with only  $2\frac{1}{4}$  fathoms water over it. To avoid the outer edge of this shoal bank, Cow island must not be brought to bear southward of West, until Kega point bears northward of N.E.  $\frac{3}{4}$  E.; mount Tai-ku, bearing North, leads westward of the shoal part of the shore bank.

A patch with  $4\frac{1}{4}$  fathoms' water over it and 6 to 8 fathoms around it, lies E.  $\frac{1}{4}$  S., distant  $5\frac{1}{2}$  miles from Cow island, with mount Tai-ku bearing

North, and Kega point N.E. by E.  $\frac{1}{4}$  E., distant  $6\frac{1}{2}$  miles. About three-quarters of a mile to the south-eastward of this patch is another of  $4\frac{1}{4}$  fathoms.

Kega point is safe to approach, there being 9 or 10 fathoms' water close to it.\*

**Viné Point**, bearing from Kega point N.E.  $\frac{1}{2}$  E. 22 miles, has a small bank on its west side, westward of which, during the north-east monsoon there is anchorage in  $3\frac{1}{2}$  fathoms, opposite a fishing village in the small bay on the west side of the point. Phan-thit bay is formed by the land trending northward from Kega point to Pho-hai river, and thence eastward to Viné point. About  $2\frac{1}{2}$  miles south of this river, and about  $1\frac{1}{2}$  miles from the shore, there is anchorage in 4 to 5 fathoms; the entrance of the river may be known by a rocky islet encircled with rocks, lying some distance off it. Tiger island lies close to the east side of Viné point, being only separated from it by a passage for small boats. Although covered with the deposit of birds it is not conspicuous, and only perceived when near the land. The coast hereabout is speckled with alternate patches of sand and verdure.

**Guio Point**, bearing N.E.  $\frac{1}{2}$  E. about  $13\frac{1}{2}$  miles from Viné point, forms the south point of Phan-ry bay, and is known by a high, steep sand-hill close to the sea; between these points the coast is moderately elevated and steep to seaward, having 10 and 11 fathoms water near it. From Guio point the coast trends in a north-easterly direction to the entrance of Phan-ry river, and is of a reddish colour: a vessel may anchor in 6 fathoms about 3 miles off shore, but the bar of the river is only navigable by boats on the flood tide. Phan-ry is a large fishing-village, having numerous boats† which are seen fishing in the offing, sometimes at a considerable distance from the shore.

**Logan Point**, bearing N.E. by E.  $\frac{1}{4}$  E. 15 miles from Guio point, is a narrow low neck of land, projecting a considerable distance into the sea. On its west side there is a small bay with a fishing-village, this bay affords good anchorage for small vessels. There is also a small village to the northward of the point, off which vessels may anchor in 5 or 6 fathoms. A shoal with 7 to 14 feet water extends nearly  $1\frac{1}{2}$  miles from the point in a south-westerly direction.

A bank about a mile in extent, with  $4\frac{1}{2}$  fathoms water over it, was discovered in 1862 by H.M.S. *Vulcan*, lying about  $2\frac{1}{2}$  miles southward of

\* The description of the coast of Cochin China has, so far, been principally derived from the late French surveys; what follows is chiefly from the surveys made by Mons. Jean Marie Dayot in 1793, and from the remarks of Captain Daniel Ross, of the Bombay Marine, who visited this coast during the years 1806-10.

† These boats and others of Cochin China, sail fast and have great stability, being safe in a high sea; their sails are of a triangular form, constructed of light mats.

Logan point, with the east extreme of the point bearing N.N.E., and the west extreme N. by W.

**Amazon Shoal**, with  $4\frac{3}{4}$  fathoms and 11 to 14 fathoms, close around, lies about 4 miles S.E.  $\frac{1}{2}$  E. from Logan point.

**Duchaffaut Shoal**, with  $4\frac{1}{4}$  fathoms, lies S. by E.  $\frac{3}{4}$  E. 6 miles from Logan point.

**Althea Shoal**, with 6 to 8 fathoms, situated 13 miles S. by E.  $\frac{1}{2}$  E. from Logan point, was unsuccessfully searched for by the French ship *Bourayne*, 1878 ; between this position, however, and Logan point there is a bank of sand and coral, with rocky heads of  $3\frac{3}{4}$  fathoms ; vessels should therefore avoid this locality, especially when there is a swell.

**Pulo Ceicer de Terre** (Culao-cau), lying N.E. by E.  $\frac{1}{2}$  E. 8 miles from Logan point is a low island, extending nearly E.N.E. and W.S.W., having near its centre a mass of rocks higher than the other parts, which is visible about 15 miles. When first seen it appears like a small peak or spire, and sometimes like a boat's sail ; the whole of the island is rocky and barren, with the exception of a little grass or green moss on the flat part. The two low extremities of the island are encompassed with rocks, which project out above and below water to a considerable distance. There are also some rocks above water on the south side, but as the danger is generally visible, the island may be approached in the day to  $2\frac{1}{2}$  or 3 miles.

**Breda Bank**.—The coast behind Pulo Ceicer de Terre forms a deep and extensive bay, stretching from Logan point to the land of cape Padaran ; and the high land of Ceicer to the north-west and north of the island is very mountainous close to the sea. Between Pulo Ceicer de Terre and the north-east side of this bay, opposite Padaran Gap (Cana), lies the Breda bank, having 12 feet, coral rocks, on its eastern edge, and there is said to be much less water to the westward. This danger is not in the way of vessels passing outside Pulo Ceicer de Terre, unless when working they stand far into the bay between that island and the land of Padaran. Inside the island there is a channel, with soundings of 5, 6, and 7 fathoms between it and Breda bank, which is sometimes frequented by the native coasting vessels.

**CAPE PADARAN** (Mui-Dinh), in lat.  $11^{\circ} 22' N.$ , long.  $109^{\circ} 2' E.$ , is high land, steep and convex to seaward, forming the projecting part of the continent to the south-east. The high land of Padaran is joined to the adjacent mountain of Ceicer by a neck of low level land (Padaran gap), visible only when near the shore on the south side the cape, but seldom seen at the distance which vessels usually pass ; this gives the land of cape Padaran an isolated appearance when approached from the south-west, and it has a similar aspect in coming from the northward.

**Anchorage** may be obtained south of Padaran gap; H.M.S. *Iron Duke*, 1876, found good shelter in 10 fathoms water, with the west extreme of Pulo Ceicer de Terre bearing S.W.  $\frac{1}{4}$  S., and the east extreme of the land E. by S.  $\frac{1}{2}$  S.; there were 8 to 10 fathoms at a cable distance around the ship, but near the shore the ground is foul and rocky, and landing at low tide is difficult.

**Soundings** do not extend far out from cape Padaran, it being a steep headland, having from 25 to 30 fathoms very near the shore. When it bore W. by N.  $\frac{1}{4}$  N., distant 2 miles, and Pulo Ceicer de Terre W. by S.  $\frac{3}{4}$  S., no bottom was obtained at 40 fathoms; with the cape N. by E.  $\frac{3}{4}$  E., and Pulo Ceicer de Terre W.  $\frac{1}{4}$  S., the soundings were 25 fathoms, about 2 miles off the bluff land of Padaran. About half-way between the cape and Pulo Ceicer de Terre, the depths begin to decrease to 20, 17, and 14 fathoms irregular soundings, when within 4 or 5 miles of the island.

The soundings about Pulo Ceicer de Terre, being in general irregular, are not always a sufficient guide in the night to show the proximity of the island; for although near it the water shoals 9, 8, or 7 fathoms, there are also overfalls from 17 to 10 and 8 fathoms in some places, at the distance of 6, 9, or 12 miles to the southward of the island. When it bears north about 12 miles, there are overfalls from 18 to 12 fathoms, and the depths are very irregular with it bearing between North and N. by E.

A little farther to the westward the soundings become more regular, decreasing in depth gradually towards the coast, and increasing to 23 or 24 fathoms near Holland bank. The channel between this bank and Logan point is 21 miles wide; vessels working through it in the night ought not to stand farther out than 22 or 20 fathoms, for the depths close to the edge of Holland bank are from 23 to 26 fathoms in some places.

**PHAN-RANG BAY**, situated between cape Padaran and Phan-rang point is named after a tolerably large town, which stands on the north entrance point of Phan-rang river; from this point a reef, dry at low tide, projects about half a mile in an easterly direction, and forms the south entrance point of a small bay named Na-van at the head of Phan-rang bay. On the north side of cape Padaran there is a bight, where vessels may anchor in the south-west monsoon, and where fresh water may be found at the south side of a small sandy bay. Large vessels ought not to anchor under 9 or 10 fathoms, for the bottom is foul near the shore.

The ship *Admiral Gambier* sailed from Canton river September 5th, 1812, and reached cape Varela on the 9th; meeting here with strong South and S.W. winds and squally weather, she continued to beat against them near the coast till the 23rd, then stood into Phan-rang bay, where she anchored in 12 fathoms, with the eastern extremity of cape Padaran bearing S.S.E., northern extreme of the bay N.N.E., distant from the shore about 2 miles. Firewood and water were obtained at this anchorage.



**Directions.**—After passing cape Padaran, if bound to Na-van bay keep about 3 miles from the shore, to avoid a reef and foul ground, which extends about  $2\frac{1}{2}$  miles north of the cape, then steer to the northward, for the north entrance point of Phan-rang bay until Na-van peak is in line with the Morne bearing N.W.  $\frac{1}{4}$  N., which will lead to the anchorage in 4 fathoms, good holding ground. There is a rivulet at the head of Na-van bay, and a stream of fresh water where the reef joins the shore.

In leaving the bay, the above directions must be observed; when clear of the reef, steer near to the south-eastward, to avoid the north side of the bay, which is rocky, until the North islet is seen well open of Phan-rang point, bearing N.E. by N.; this point is low, and surrounded by a dry sand bank.

**Vung-gang Bay**, situated 5 miles north of Phan-rang point, is 4 cables wide at its entrance and one mile deep in a N.E. by N. direction; there are 8 to 12 fathoms water in the entrance, decreasing gradually to 18 feet within a cable of the shore at the head of the bay.\*

**DAVAICH HEAD**, (False Varela) † named Mui-Davaich by the natives, in lat.  $11^{\circ} 44' N.$ , long.  $109^{\circ} 13' E.$  (approximate), is formed by a high oblong mountain, rising from the steep cliffs that front the sea; it may be known from the other prominent headlands by its great height, convex outline, and regularly sloping to seaward. There are 18 fathoms water within half a mile of the head.

**Cam-Ranh Bay and Harbour.**—The entrance to Cam-ranh bay is bounded on the south side by the land of Davaich head and Honchia isle, and on the north side by the high island Tagne; this is called the large entrance, in which there are 9 to 18 fathoms water. The Little pass is between the north point of Tagne island and the opposite point of the main, with 3 and 5 fathoms water, but it is narrow, and should not be used except in a case of necessity. There is a channel half a mile wide between Honchia isle and the main land, having 11 to 14 fathoms water. Cam-ranh bay has 10 to 15 fathoms water, and is protected from the sea by Tagne island.‡

About 2 miles north-west of Tagne island is the entrance to Cam-ranh harbour, about three-quarters of a mile wide, formed by a point of land on the north side and Cam-ranh point, the extreme of a long neck or narrow peninsula to the south-west. The inner harbour is an extensive lagoon; the best anchorage is a little inside the entrance, in 10 to 6 or 7 fathoms; the western part of the harbour is shoal, and the shores around the western

\* See Admiralty plan of Vung-gang bay, No. 1,008, scale,  $m=4$  inches.

† Named from a rock or knob upon the mountain, a little inland, having some resemblance to that over cape Varela, although not nearly so conspicuous.

‡ See Admiralty plan of Cam-ranh bay, No. 1,003, scale,  $m=0.4$  of an inch.

and northern parts are bordered by a coral bank. From the northern extremity of the harbour a river runs to the northward parallel to the coast for 16 or 17 miles; it is separated from the sea by a narrow neck of land, consisting of small sand-hills, and a large, barren, sandy plain; the source of the river lies in marshy ground, not far from the city of Nha-trang.

There are no hidden dangers in either the bay or harbour, the bottom being generally mud, and good holding ground. The harbour is mostly inhabited by fishermen.

**Fisher Islands**, in lat.  $12^{\circ} 2'$  to  $12^{\circ} 4'$  N., are of moderate height, and lie  $3\frac{1}{2}$  to 6 miles off the mainland northward of Cam-ranh bay. The southernmost island is named Hon-noi; the northernmost and largest, Hon-ngai, has some islets and rocks near it. The channel inside these islands is said to be safe, with 12 fathoms water near the shore, and there is good anchorage opposite them in the south-west monsoon, close to the coast at the sandy plain. This plain is about 9 miles in extent, and terminates at the southern entrance of Nha-trang bay; at each extreme there is a bluff point, and the space comprehended between them is named Dgiay bay.

The passage inside Fisher islands is thought to be safe, and it may be adopted if intending to proceed into Nha-trang bay by the southern entrance; but caution must be used, for there is to the north-west of these islands, in the fair track, a rocky patch, on which the ship *Lord Castlereagh* shoaled suddenly, August 18th, 1807. She had worked out of Nha-trang bay in the morning, between Tré island and the two islands near the shore, and observed at noon in lat.  $12^{\circ} 8' N.$  After steering South 4 miles, with the wind at E.S.E., the water shoaled suddenly from 13 to  $6\frac{1}{2}$  fathoms, and the helm was put down; rocks and sea-weed were seen under the bottom, but the least water by the lead was  $6\frac{1}{2}$  fathoms; she deepened to 13 fathoms in standing about 2 cables' lengths to the north-eastward. When upon this shoal patch, Hon-noi island bore S.E.  $\frac{1}{4}$  E., the bluff point at the north extreme of Dgiay bay N.W.  $\frac{1}{4}$  W., the bluff point at the south extreme S. by E.-easterly, distance off the sand-downs on the shore of Dgiay bay  $2\frac{1}{2}$  or 3 miles.\* Inside this rocky patch there are 12 and 11 fathoms, regular soundings.

**Sunken Rock**.—Captain A. C. Strode, H.M.S. *Vulcan*, 1862, reports having seen "what was evidently a sunken rock, lying three-quarters of a mile W.N.W. of the southernmost of the Fisher islands, in lat.  $12^{\circ} 1' N.$ , long.  $109^{\circ} 16' E.$ "

**Tré Island**, in lat.  $12^{\circ} 16' N.$ , is high, and contains several coves, where vessels may repair damages. The ship *Upton Castle* anchored to

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\* These bearings are irreconcilable with the positions of the points as given in M. Dayot's chart.

the westward of Tré island, between the inner of the small islands and the main, to the southward of Nha-trang bay, and found it good anchorage, and convenient for watering.

**NHA-TRANG BAY** is protected by Tré island and its adjoining isles to the southward, and by the mainland, Pyramid, and Dune islands to the northward and eastward. The anchorage is in 8 fathoms, good holding ground, with the entrance of Nha-trang river bearing about N.W. or N.W.  $\frac{1}{2}$  N., distant one mile, and Tré island E.S.E. The river has a bar, will only admit vessels drawing 7 or 8 feet water, and communicates with Nha-trang city, about 5 miles to the westward. This city is the capital of the provinces Nha-trang and Bin-kang, and has a fort, built in the European manner, by Monsieur Oliver, a French engineer. Here they manufacture some silk and other articles, and carry on trade with different parts of the coast.

A vessel in want of wood or water may obtain them by touching at this place. The ship *Lord Castlereagh*, on her passage from China, anchored, August 15th, 1807, in 9 fathoms, stiff clay, with the entrance to the river N.W.  $\frac{3}{4}$  N.; White rock N. by E.; Shala island N.E.  $\frac{1}{2}$  E.; Pyramid island E. by N.; Tré island from E.  $\frac{1}{2}$  S. to S.E.  $\frac{1}{4}$  S., and a ledge of rocks off it E. by S.  $\frac{3}{4}$  S. She watered with her own boats in the river; the water was found very good a little inside the entrance at low tide, and about 4 or 5 miles up the water was fresh at half-ebb. About 2 miles up the river there is not depth sufficient for a loaded long-boat at half-ebb, there being several shoal banks stretching across it.

To proceed into Nha-trang bay by the south entrance, a vessel may pass on either side the Fisher islands, then between Tré island and the two isles to the south-west of it; the soundings are regular, from 12 fathoms at the entrance to 6 and 7 fathoms between the west point of Tré island and the main, where the channel is  $1\frac{1}{4}$  or  $1\frac{1}{2}$  miles wide. The passage contiguous to the main, inside the two isles that lie to the south-west of Tré island, is also safe; but the one between them and Tré island is wider, and on other accounts preferable.\*

The northern entrance into Nha-trang bay, although wide, has a coral bank nearly in mid-channel, opposite the large bay of Bin-kang, which makes it necessary to keep nearest to Tré island. There is a passage between the west point of Bin-kang bay and Turtle island which lies off it; and there is also a passage between the white rock named Seche island and the east point of the bay. From the above coral bank the north-east extreme of the land eastward of Bin-kang bay is in line with Seche island, and Dune island bears E. by S.  $\frac{1}{2}$  S. Captain Ross was twice on this coral

\* See Admiralty plan of Nha-trang bay, No. 1,008; scale,  $m=0\cdot4$  of an inch.  
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bank, and did not get less than 4 fathoms water, although it is said by M. Dayot to have as little as 3 fathoms on it.

**Tides.**—It is high water, full and change, at Nha-trang bay, at 8 h. 30 m.; springs rise 5 or 6 feet. There is only flood and one ebb in 24 hours.

**Pyramid, Dune, and Shala Islands** (the Fisher islands of Horsburg), are three small barren islands, with some rocks close to them. Pyramid, the southernmost island, in lat.  $12^{\circ} 19' N.$ , is a high regular cone or pyramid, conspicuous as a mark in sailing along the coast. The channel between it and Tré island is safe, and there are soundings of 60 to 75 fathoms about 10 or 12 miles outside these islands; the soundings inside Pyramid are from 16 to 20 fathoms, decreasing regularly close to the south side of the entrance of Hon-Cohe bay.\*

Dune island, lying about a mile to the north-east of Pyramid, is of moderate height, flat on the summit, like the crown of a hat, when viewed in some directions; to the south-eastward of it are some islets or rocks. Shala lies 5 or 6 miles to the northward of Dune island, and about 3 miles to the south-eastward of the peninsula of Hon-Cohe. There is a channel with 22 to 25 fathoms water between Dune and Shala, and another with 11 to 14 fathoms between the latter island and the peninsula.

**Hon-Cohe Bay**, the next large bight to the northward of Bin-kang bay, has several islands in it, the outermost of which, named Bac, has about a mile eastward of it, a rock called the Button, and three islands to the westward. Between Bac and the eastern of these three islands there is a safe passage, and also between the latter and the other two islands, which lie much nearer the western shore; but the widest channel is outside Bac, between it and the east entrance point of the bay. Having passed these islands, if bound into the bay, steer to the north-westward in mid-channel between the point on the west side that forms Hon-Cohe harbour, and a small island to the eastward; then steer westerly to round the point, and afterwards to the southward to the anchorage on the west side of the point, in 4 fathoms good holding-ground sheltered all round. At the head of the harbour is Hon-Cohe village.†

On the east side of the bay are several islands at the entrance of Coua-bê harbour, into which vessels may warp, and moor to the trees, there being plenty of water and no danger; but vessels do not usually go there, as the harbour is inhabited only by a few fishermen. This harbour or cove is formed by high mountains, and communicates with the sea by Coua-bê passage to the south-eastward, bounded on each side by high

\* See Admiralty chart of Cochin China, Sheet 2, Nha-trang to Touron, No. 1,342.

† See Admiralty plan of Hon-Cohe and Coua-bê harbours, No. 1,009; scale,  $m=0.4$  of an inch.

land, resembling steep perpendicular walls; it is unknown whether this passage is navigable or otherwise. There are regular soundings along the east side of the bay; but it is rocky and shoal near the northern and western shores; in the middle of it there are several islands.

**Tides.**—It is high water, full and change, at Hon-Cohe at 11 h. 30 m.; springs rise 5 feet.

**The Three Kings** are three rocks, lying about  $1\frac{1}{2}$  miles eastward of the eastern point of entrance of Coua-bê passage; they are bold to approach, having 30 fathoms water near them, with a passage between them and the point.

**Hone-Gome bight.**—About 5 miles northward of the Three Kings, and close to a point of the main-land, lies the small island Doi-moi, at some views resembling a turret or sentry-box. The point, from which this island is separated by a very narrow channel, is the easternmost land of Cochin China, being a little to the eastward of the meridian of cape Varela. Between it and cape Varela, the land recedes and forms Hone-Gome bight, in which the soundings are regular, and there is good anchorage in 8 or 10 fathoms, sandy bottom, at the south side, about 2 miles W.N.W. of the point, near a small island. The sandy flat, which extends from the high land of Coua-bê to that of cape Varela, is a neck of land scarcely a mile broad in some places, separating the head of Hon-Cohe bay from the sea; and the three islands in the middle of that bay may in passing be perceived over the sandy flat.

**Water** can be obtained at the southern extremity of the sandy flat, but in the dry season wells must be dug in the sand, at some distance from the sea. Fresh water may be procured in this manner on most parts of the coast.

**Port Ong-ro**, at the northern extremity of Hone-Gome bight, seems safe at all times. It is about a mile wide at entrance, stretching about 3 miles inland, in a north-easterly direction, with soundings of 8, 7, and 6 fathoms, close to the village at its head. The bottom is fine clay, except within 100 yards of the shore on either side, where it is frequently sand or coral rocks. Varda is a small island near the shore, to the south-westward of the entrance. To proceed into the harbour, bring the peak to bear N.N.W., and steer for it on this bearing, which will lead into the entrance, where the depth will be 10 or  $9\frac{1}{2}$  fathoms.\*

**Water.**—On the west side the harbour fresh water may be procured in several places, but the best watering-place is about half-way up on the same side, to the north-eastward of a little cove.

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\* See Admiralty plan of port Ong-ro, No. 1,009.

**CAPE VARELA**, or Pagoda, in lat.  $12^{\circ} 55' N.$ , long.  $109^{\circ} 24\frac{1}{2}' E.$  is formed of steep cliffs, extending nearly North and South  $2\frac{1}{2}$  miles, having in the middle a small sandy bay, where a stream of good water descends from the mountain into the sea. The cape may be seen from a distance of 28 or 30 miles, and when first perceived in coming from the northward appears like an island, the gap of low land which joins it to the mountain behind being then depressed under the horizon. This mountain\* rises directly over the cape, and upon its summit there is a large perpendicular rock, resembling a pagoda or chimney, called Da-bia by the natives, which makes it very conspicuous; and it may be seen about 60 miles' distance, either from the northward or southward, in clear weather; but the summits of the mountains are frequently obscured by clouds or vapours, particularly in the N.E. monsoon. The cape may be approached close-to, there being 20 and 25 fathoms water around it at a small distance from the shore.

**Directions.** — From abreast Davaich head or False Varela the course is N. by E.  $\frac{1}{2}$  E. and N. by E., until Pyramid island and the other islands adjacent to it are passed, then N.  $\frac{1}{4}$  E., and North to cape Varela. The best track in the night, with a fair wind, is to keep from 6 to 9 miles off the different headlands, which, with the Fisher islands and Pyramid group, will be visible at that distance in passing along, if the weather be clear. When the weather is unfavourable, edge farther out, to give the islands a prudent berth; and if soundings are obtained, the vessel will not be far from them, or some of the headlands.

From cape Varela to cape San-ho the course is N. by W., or N.  $\frac{1}{2}$  W., about 50 miles, but soundings will not be obtained in this track unless near the coast. A little inland there is a mount in the vicinity of the city of Quin-hon, with a spired pagoda on it; further to the northward there is a mountain on the summit of which there is a tower crowned with a small spire or funnel: the latter is in about lat  $14^{\circ} 6' N.$ , and they are discernible when sailing along the coast at a considerable distance.

**Perforated Rock.**—About 4 miles north from cape Varela lies a mass of rocks, some of them level with the water's edge; but the central rock is considerably elevated, with a large stone on its summit, appearing as if placed by art: in passing near it, when abreast, a hole through will be perceived below the upper stone, which has given it the name of Perforated rock. There is safe passage, with 20 to 25 fathoms water between it and the mainland.

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\* There is a hot spring in the middle of the cape mountain, and there is said to be silver ore in some of these mountains, which form double and treble ridges behind the cape.

**Phuyen Bight** is formed by the land taking a west and north-west direction from cape Varela to the Phuyen river, which is distant from the cape about 11 miles. About 18 or 20 miles N.W. from the cape, not far inland, stands a high isolated mountain, named Conical mountain, or Epervier; a little to the south-west of it there is a sloping piece of land, with a rock or pagoda on it, which is only discerned when near the shore. Here the mountains recede to the westward, a great distance inland, and the cape Varela chain stretching also to the westward, a large space of low land is formed close to the sea round Phuyen bight, between cape Varela and Conical mountain. The entrance of Phuyen river is to the southward of this mountain, and will only admit boats. A vessel may anchor off it in 8 or 9 fathoms, good ground, with Conical mountain bearing about N.N.W., and a pagoda on a mountain some distance inland N.W.; but these mountains are frequently obscured by clouds.

The soundings across Phuyen bight are 30 to 35 fathoms, about 4 and 5 miles off shore. Several flat islands lie near the coast on the north side of the bight, of which Maignia is the largest, distant about 2 miles from the shore, having an indifferent passage inside, of irregular depths, and rocky bottom; close to it on the outside there are 23 and 24 fathoms water. Abreast this island, on the coast near the sea, there are two small hummocks, one of them resembling a sugar-loaf.

**PHUYEN HARBOUR.**—The entrance to this spacious harbour in lat.  $13^{\circ} 23' N.$ , is about 2 miles wide, with 10 and 11 fathoms water on either side the small island that lies a little inside, named Nest island, from the west side of which a reef extends in that direction nearly a quarter of a mile. The country around Phuyen harbour is well cultivated, and, together with the houses and huts interspersed along the hills, presents, in entering it, a beautiful landscape. The province of Phuyen is better cultivated than any other in Cochin China.

The harbour has general depths in it from 12 to 5 fathoms; and three anchorages, port Xuan-daï on its south side, port Vung-lam on its west side, and port Vung-chao in its north-east corner. The anchorage of port Xuan-daï is 7 or 8 fathoms, sandy bottom, with the entrance of the river bearing South, and Nest island about N.E. by E. That of port Vung-lam is in 7 fathoms, mud, on the north side of an island that fronts the port, with the village bearing S.W. by W. Port Vung-chao is sheltered from every wind by circumjacent mountains, and the anchorage is in  $4\frac{1}{2}$  or 5 fathoms, with the houses in the grove of cocoa-nut trees bearing S.E. to S.E. by E. The north shore of this port is fronted by a coral reef which is visible at low water. In proceeding towards Vung-chao the Buoy rock must be avoided, which lies nearly awash about a third of a mile from the eastern shore of the inlet. There is a small cove, named

Vung-la, on the north side of entrance of the inlet, where two or three vessels might be hove down, if requisite.\*

**Water.**—The ship *Vansittart*, Captain Dalrymple, having sailed from Singapore, October 3rd, 1827, and reaching lat.  $14^{\circ}$  N., long.  $110^{\circ}$  E., on the 20th encountered a steady north-east monsoon, when she bore away for Phuyen harbour to fill up water, and anchored in  $8\frac{1}{2}$  fathoms, the north point of entrance of the harbour E. by N.  $\frac{1}{2}$  N., south point of entrance S.S.E.  $\frac{1}{2}$  E., Nest island S. by E.  $\frac{3}{4}$  E., and Buoy rock N.W. The watering place is in a small bay to the N. by E., in which is a fine cascade close to the beach, and very convenient for watering. The Buoy rock was covered at half-flood, and appeared like a boat at low water. Maignia island, to the southward of the entrance of the harbour, is high, and was shut in with the southern point of entrance from the ship's anchorage, which was rather too far to the southward in the north-east monsoon.

**Gain-ba Point**, about 3 miles northward of the entrance of Phuyen harbour, has small bays formed on each side of it, where vessels may occasionally anchor; in the bay on the south side there is a fishing village. This point, and the coast between it and the entrance of Phuyen harbour, may be passed pretty close in 10 or 12 fathoms water.

About 3 miles to the northward of Gain-ba point is another point called Vung-trich; and  $4\frac{1}{2}$  miles beyond the latter is another, named Vung-mon; these two points are also bold, and may be passed in 10 or 12 fathoms water.

**Cou-Mong Harbour.**—Between Vung-trich and Vung-mon points is the bay of Vung-mon, which is safe to approach, with regular soundings in it towards the shore. On its south side, in lat.  $13^{\circ} 30'$  N., is the narrow entrance of Cou-mong harbour, with 7 and 8 fathoms water in it, 5 and 4 fathoms a little inside, and 3 to 4 fathoms to the southward of the small island, Cou-mong, in the middle of the harbour. This is a good harbour for small vessels; and there is a little village among the cocoa-nut trees to the northward of the island. Vung-mon point, like that of Gain-ba, has a bay on each side, with a small fishing village in the northern one; a vessel intending to anchor there must give a berth to the northern extremity of the point, for rocks project from it above and under water, having 10 fathoms close to them; the anchorage also is in 10 fathoms.†

**Pulo Cambir** (fronting Cou-mong bay) has a regular sloping appearance, and is visible about 18 miles; it is of considerable size, extending N.N.W. and S.S.E., having a few fishermen's huts on the south-west side; and at a short distance S.E. from its south end there are some

\* See Admiralty plan of Phuyen harbour, No. 1,011; scale,  $m=0\cdot4$  of an inch.

† See Admiralty plan of Cou-mong harbour, on Sheet No. 1,342; scale  $m=0\cdot4$  of an inch.



sharp-peaked rocks, named the Two Paps. This island is nearly abreast and about 2 or 3 miles distant from Vung-mon point; and the channel between it and the coast is safe, with 12 and 13 fathoms near the point, 20 fathoms towards the island, and no soundings at a short distance outside the island. There are 23 fathoms with the island bearing N. by W., 5 or 6 miles distant.

**Date Island**, lying about 6 miles N.N.W. of Vung-mon point, and  $1\frac{1}{2}$  miles distant from the main, is of round form, and covered with trees. Between it and another round island nearer the shore, there is a passage with 5 and 6 fathoms water, and there are some rocks above water to the northward of the latter island. From Vung-mon point to opposite Date island the coast is steep and very mountainous, forming a considerable bight, named Cambir bay.

**QUIN-HON HARBOUR**, situated 6 miles north from Date island, is bounded on the west by a neck of sand about 4 miles long, and on the east by high steep land. This harbour was a place of considerable trade prior to the long war between the king of Cochin-China and his rebellious subjects. It is sheltered from southerly winds by the curved form of the high land on that side the entrance, and is protected by forts built on the point; but vessels of large draught are prevented from entering it by a shoal bank that extends a long way out from the western point, and which, stretching across to the land on the east side of the entrance, forms a bar, on which there are only 3 and  $3\frac{1}{2}$  fathoms water.\*

The deepest water is close to the eastern point of entrance, where, it is stated, there may be  $3\frac{1}{2}$  to 4 fathoms on the bar, at high water spring tides; inside of it the depth increases to 7, 8, and 10 fathoms. The western part and bottom of the harbour is a spacious lagoon, with shoal water; several small rivers fall into it, one of which communicates with the city of Quin-hon, situated about 15 miles to the westward, and is the capital of the province of the same name. A vessel not intending to go into the harbour may anchor outside the bar in  $4\frac{1}{2}$  fathoms, good holding ground, with the sandy west point a little open with the east point of the entrance.

**Supplies.**—Bullocks, goats, ducks, fowls, vegetables, and fruit can be obtained, at Quin-hon; also wood and coal, the latter can not be depended on.

**Water.**—Good water can be obtained from a stream on the east shore of the harbour.

**CAPE SAN-HO**, situated about  $2\frac{1}{2}$  or 3 miles eastward of the entrance of Quin-hon harbour, is a high bluff headland, forming the eastern

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\* See Admiralty plan of Quin-hon harbour on Sheet No. 1,342; scale  $m=0.8$  of an inch.

point of the bay of Quin-hon. Close to the land, a little to the northward of the cape, there is an island, named Hau by the natives; and the coast, which extends about 5 miles north from the cape, is steep and high.

Abreast the north point of this high land there are some small islets, one of which, Cau, is of a round form, and lies about one mile off the point; and nearly  $1\frac{1}{2}$  miles outside of this there are some rocky islets, named Hom-Co by the natives, and by Europeans Black Jack. Between these and Cau isle, and also inside the latter, vessels may pass, there being 15 or 20 fathoms water around them. On the north side the point opposite these islets, during the south-west monsoon, there is good anchorage fronting a small bay formed by the point.

**Buffalo Island.** in about lat.  $14^{\circ} 5' N.$ , and 4 miles distant from the high land abreast, is a convex rock of sloping form, moderately elevated, but will not be seen in the night until it is approached very close. It lies 15 miles to the northward of the north point of the high land that forms Quin-hon harbour; from which point the coast is low for some distance, and again becomes high opposite Buffalo island. The water is very deep outside this rock, and the coast to the westward is bold and safe to approach, having soundings of 14 and 16 fathoms near the shore. A fleet of ships from China, having no observations, got close to this part of the coast in the night; some of the ships passed outside the Buffalo, others passed between it and the main, and found the channel safe, with regular soundings.

**Nuoc-Ngol**, or Fresh-water point and bay, lie about 9 miles to the north-west of Buffalo island. There is a small island nearly touching the point, to the southward of which is the bay, having a village close under the point; and there is good anchorage in 10 or 12 fathoms, sandy bottom.

**Turtle Island**, situated about 9 miles farther to the northward, and 3 miles off shore, is small and low; but there is a safe channel between it and the shore. There are soundings of 65 and 70 fathoms about 10 or 12 miles off this part of the coast.

**Tamquan River** disembogues in about lat.  $14^{\circ} 32' N.$ , at the northern extremity of a sandy flat; the bar at the entrance is passable only by boats at high water. The anchorage, in 7 or 8 fathoms, mud and sand, is partly sheltered from northerly winds by the coast stretching out about 2 miles eastward from the north side of the entrance.

**Tiphou River** falls into the sea at 5 miles to the southward of the Tamquan, in the middle of the sandy flat. The anchorage off it is in 7 or 8 fathoms, sandy bottom.

**The COAST** from Tamquan point trends about North 6 miles, thence N.W. by N. about 33 miles to the entrance of the Quan-gai river:

it is steep and bold to approach, there being 30 fathoms within 2 or 3 miles of the shore; contiguous to the sea the coast is of moderate height, but the country is very high inland. There is anchorage off the Quan-gai river.

Cape Batangan, in lat.  $15^{\circ} 16' N.$ , about 6 miles to the north-eastward of Quan-gai river, projects to seaward, and forms on its south side a bay, in which, at about 2 miles distant from the cape, lies Flat rock, nearly even with the water's edge; and at  $1\frac{1}{4}$  miles N.N.W.  $\frac{1}{2}$  W. from this rock lies Indre rock, with 15 feet water, the country vessels sometimes pass between these rocks and the cape. The coast from this cape to cape Bantam trends about N.N.W. 12 miles, and the soundings are 20 and 25 fathoms near the shore.

**Pulo Canton**, named Collao-ray by the natives, in lat.  $15^{\circ} 24' N.$ , long.  $109^{\circ} 9' E.$ , is nearly 3 miles long east and west, and  $1\frac{1}{4}$  miles broad, and visible 26 or 27 miles. It has a level aspect when viewed from southward; its west side is inhabited, well cultivated, and fresh water may be procured. A reef projects from its south-east end; and to the northward there are overfalls and rocky bottom, extending about 3 miles from it, and a low island that lies about 2 miles to the north-westward. The north-east sides of these two islands should not be closely approached, for although it is not known that danger exists, overfalls of 15 to 7 fathoms have been experienced about 8 or 9 miles to the northward of Pulo Canton. When it bears S.S.E., distant 12 miles, there are 50 fathoms water.

The channel between Pulo Canton and the main is safe, with soundings of 25 to 40 fathoms; within 2 or 3 miles of the main, the depths are generally about 30 fathoms, decreasing to 25 fathoms towards Pulo Canton; the low island to the northward should not be approached.

**CAUTION.**—It may be proper to observe, that vessels adopting the inner passage to China during the strength of the south-west monsoon, in June, July, and August, ought not to edge off from the coast of Cochin China until they pass within sight of Pulo Canton, particularly if the winds are light and baffling; in such case it is advisable to steer well to the northward towards the south part of Hainan, to prevent being driven near the north-west extremity of the Paracels, should a north-westerly storm happen to blow from the gulf of Tong King, which has been frequently experienced in June and July.

**Qui-Quik Bay**, formed on the west side of cape Bantam, close to the foot of high mountains, is about 9 miles wide, and 3 miles deep, with some islets in it, and small creeks where fresh water may be procured; this bay affords good anchorage in the south-west monsoon. At its north-west extremity there is a small bay or cove under cape Happeix, said to

afford shelter in the north-east monsoon; opposite to it, An-hoa river may be discerned, which extends a great distance inland.\*

**Hon-ong or False Collao Island.**—From cape Happoix the coast trends nearly N.W. by N. 42 miles to cape Touron, and in this space the country is mountainous a little inland. About 19 miles northward from cape Happoix, and about 12 miles off the coast, lies False Collao island, of considerable height.

**Cham-Collao** 1230 feet high, situated 11 miles N.W.  $\frac{3}{4}$  W. from Hon-ong is about 4 miles in length N.N.W. and S.S.E., and  $1\frac{3}{4}$  miles broad, having some islets adjoining its south-west side, and others between 2 and 4 miles westward from its north-west part. It is inhabited, well cultivated, and the bay on the west side, affords good shelter during the north-east monsoon, with a convenient watering place. The channel between these islands and the main is safe, with soundings mostly from 6 to 10 fathoms; and in some parts 5 fathoms. Opposite this island lies the entrance of the Fai-foh river (Kua-doi), which, by a narrow arm of the sea, communicates with Touron bay: near the entrance of this river there is a mass of Marble rocks, very conspicuous when sailing near the coasts. The coast is low at the entrance of Fai-foh river, but may be recognised by the masts of the junks at anchor inside; vessels should anchor well out from the entrance as the holding ground is bad.†

**TOURON BAY.**‡—Cape Touron, or Tien-Tchu, in lat.  $16^{\circ} 8' N.$ , long.  $108^{\circ} 21' E.$ , is the eastern extreme of the peninsula that forms the east side of Touron bay (named Han-san by the natives); and Collao-Han or Touron island, lies close to the point of land that forms the north-west side of its entrance. The entrance is  $2\frac{3}{4}$  miles wide, with regular soundings of 15 and 14 fathoms, decreasing inside to 8, 7, and 6 fathoms. The northern shore of the peninsular must be given a berth, for a reef on which the sea sometimes breaks, projects about three-quarters of a mile from the third point. A rock awash lies a quarter of a mile off the north point of the peninsular, with a depth of 6 and 7 fathoms between it and the shore. The inner point of the peninsula is also joined to a small contiguous island by a shoal. This small island is in lat.  $16^{\circ} 7' N.$ , long.  $108^{\circ} 17' E.$ , and the usual anchorage for vessels is to the southward of it, in 4 or 5 fathoms, sheltered from all winds.

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\* See Admiralty chart:—Qui-quick bay and adjacent coast, No. 1,005; scale,  $m=0.78$  of an inch.

† See Admiralty plan of Cham-collao, with entrance to Fai-foh river, No. 1,010; scale,  $m=1.5$  inches.

‡ See Admiralty plan of Touron bay, No. 1,268; scale,  $m=1.4$  inches.

Several rivers fall into this bay, and the depths decrease regularly towards the circumadjacent shores ; but Touron river, at the south-east side of the bay, and also the east side of the bay, is fronted by a shoal bank, which extends a mile from the shore. This was formerly a great place of trade, and some European nations had factories here ; but no trade has been carried on by Europeans to this port for a considerable time past. The peninsula and Touron island are both high, and the country inland is generally high and mountainous. The soundings about 2 or 3 miles outside cape Touron are 24 and 25 fathoms ; the same depths will be obtained about 6 or 8 miles to the north-eastward of the island, abreast the entrance of the bay ; and the bottom is generally mud or ooze.

Approaching Touron bay from the southward, the mass of Marble rocks (page 362) will appear insulated, resembling a castle ; a few miles to the northward of which the cape peninsula will be perceived, with two peaked hills on it, one of them much higher than the other, and united by a low narrow isthmus : having approached the peninsula, steer round it at a moderate distance, into the harbour.

**Tides.**—It is high water, full and change, in Touron bay, at 3h. ; springs rise 4 feet.

**Cape Choumay**,\* or Chouvay, situated  $22\frac{1}{2}$  miles N.W. by W. from cape Touron, is the extremity of a round and rugged peninsula of moderate height, which, united to the coast by an isthmus of sand, appears like an island with two summits when seen from the north-east or south-west. A chain of high mountains with round summits extend almost to the coast. At 4 miles west of the cape and near the coast is a small isolated hill, which has the appearance of an island, after which the hilly ground ceases, and the coast becomes low and sandy. There is good anchorage in a small bay on the west side of the cape, where there is a river : a little farther to the north-westward are other rivers ; and a river falls into the sea between the two capes. A canal leads from cape Choumay to Hué, and facilitates the communication between that city and Touron.

**River Hué**, or Hue-Fo, the entrance to which is in lat.  $16^{\circ} 34' 50''$  N., is generally considered the boundary between the coast of Cochin China and Tong King. Between cape Choumay and this river the coast is formed of sand-hills, the summits of which are covered with numerous villages, surrounded by trees and cultivated fields ; a peculiarity which will prevent mistaking this part of the coast for that north of Hué, where the villages are on the sides and not on the summits of the sand-hills. The position of the river is marked by a large fort with a flagstaff, built on the

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\* The description of this coast from cape St. James to cape Touron is partly taken from the surveys made by Jean Marie Dayot in 1793–98. The remainder of the chapter is from the *Mer de Chine*, 1st Part, 1865.

west point of entrance; at half a mile west of this is a small hill with a remarkable pagoda. There is good anchorage off the mouth of the river in 6 fathoms, muddy bottom; but it is said that there is a heavy swell along the coast during the north-east monsoon. The bar of the river has only 10 feet on it at low water.

The city of Hué, situated about 12 miles from the mouth of the river, is sometimes the residence of the king of Cochin China. It is composed of two parts, the inner, and the outer town where the mass of the population resides, which has been estimated at 100,000 souls; the inner town is a large square fortress, built after Vauban, according to the plans of the French Engineers. The river encloses it on two sides, besides a canal 130 feet wide, by which it is entirely surrounded.

**Weather.**—At Hué the greatest heat in summer is 101° (Fahrenheit), and the greatest cold during winter 57°; but the rains of this season make the winter sufficiently severe. The rain commences in Tong King in May, and continues till August, September, or October. The heat during summer is often excessive, and the cold during December, January, and February is very keen, disagreeable, and accompanied by fogs. September, October, and November are mild. The variations of the atmosphere are very sudden; often after oppressive heat and a dead calm there occur sudden strong winds and fearful storms. A dryness which burns everything is succeeded by torrents of destructive rain.

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## CHAPTER XVII.

## TONG KING GULF.—HAINAN ISLAND.

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VARIATION, from  $2^{\circ}$  to  $1^{\circ} 25'$  East in 1879.

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**TONG KING GULF** is the great bend of the coast comprised between the parallels of  $17^{\circ}$  and  $22^{\circ}$  N., and which is rendered a deep inlet by the peninsula of Lien-chew and the island of Hainan, which protect it to the eastward. The entrance between cape Lay on the west and the south-west part of Hainan on the east is about 120 miles wide, which is the general width of the gulf itself. Several islands lie contiguous to the western shore of the gulf, and numerous small islands and shoals at its head. Soundings may be obtained all over it, 45 and 40 fathoms in the middle, decreasing towards either shore; the bottom is generally soft, fit for anchorage. In some parts the soundings appear to be irregular, for the ship *Rolla*,\* in lat.  $17^{\circ} 25'$  N., to the northward of Tiger island, shoaled from 35 and 30 fathoms, mud, to 10 fathoms on a bank, steering W. by S.; and soon deepened again to 25 and 30 fathoms, steering W, by N.†

**Winds.**—There are two seasons in Tong King gulf, namely, the dry and the rainy. During the latter period the heat is excessive, commencing towards the end of April and terminating in August, when the rain decreases, and in September or October the weather is tolerable. The dry season commences in November, from the middle of which high winds occur from the North, which vary to the East and E.S.E. towards the latter end of the month. At the end of December the wind veers again from N.N.E. to East, accompanied with fog. During January and February it blows from the N.N.E.; in April the weather is not so cold and the wind more moderate.

This gulf is much exposed to typhoons, the effects of which are so terrible on the south coast of China, and no port is known where shelter can be found from these dangerous storms.

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\* Horsburgh.

† See Admiralty charts:—China sea, Northern portion, No. 2,661a; Tong King gulf, No. 2,062, scale,  $m = 0.07$  of an inch; and Cochin China, Sheet 3, No. 1,264, scale,  $m = 0.1$  of an inch.

**Cape Lay.**—From Hué river, a low and sandy coast, trends about N.W.  $\frac{1}{4}$  W. 47 miles to cape Lay, which is rocky, of moderate height, and covered with several patches of trees. There is a river 11 miles S.S.E. of the cape, near a prominent projection, named Palm point, in consequence of there being two palm trees on the left bank of the river. A bar, on which the sea breaks heavily, appears to obstruct the entrance to this river, which is very narrow.

A bank extends a short distance off this cape; within 2 miles of the cape the depth varies from 15 to 20 fathoms. All along this low coast and 2 or 3 miles off shore the soundings are from 11 to 14 fathoms, with sandy bottom near Hué river; farther to the N.W. is mud, and the depth decreases towards cape Lay.

**Tiger Island**, distant about 12 miles E. by N. from cape Lay, was explored in 1831 by M. Laplace, Commander of the French corvette *Favorite*. It is small, about a mile in extent, and its centre rises to a peak about 328 feet in height, which is visible in clear weather at a distance of 15 to 18 miles. The south point is perpendicular; the north point terminates in a low narrow neck of land. The channel which separates it from the coast is clear, with 17 to 23 fathoms water; along the coast there is generally from 12 to 16 fathoms, blue mud, or mud and sand. About 18 or 21 miles N.E. of the island, the general depth is from 30 to 34 fathoms, and from thence this depth extends to the entrance of the gulf, as far as the west part of Haïan island.

**The COAST** from cape Lay trends in a north-westerly direction for about 32 miles thence westerly 6 miles to the entrance of Quïa Höy river, at which stands a fort; from Quïa Höy the coast trends N. by W. for about 30 miles to cape Boung Quioua, forming a bay of moderate depth, which is bordered in the interior by a chain of high mountains extending towards the S.S.E., and presenting several parallel ridges with peaks of fantastic form. These are the only elevations which appear along this low coast; some of their ridges extend close to the shore.

North-westward of cape Lay the coast is sandy and low; northward of Quïa Höy the sand-hills are of a reddish colour, and their summits are covered with brushwood. The coast is elevated, and forms two bays of considerable depth, in each of which is a small stream.

**Estrée Rock**, covered at high water, lies about 7 miles north of Quïa Höy river and 6 miles from the coast.

**Cape Boung Quioua**, easily known by its large red spots, is formed of elevated land. There are two islands near it, and a third at  $2\frac{1}{2}$  or 3 miles to the S.S.W.; the latter, Boissieux island, terminates towards the west in a long reef which projects  $1\frac{1}{4}$  miles towards the coast; between the two former islands there is a narrow channel with  $3\frac{1}{2}$  to  $6\frac{1}{2}$  fathoms



water, and  $2\frac{3}{4}$  fathoms between the cape and the little island close to its extreme point.

The anchorage of Boung Quioua is very good for all kinds of vessels during the north-east monsoon. A vessel can anchor in  $4\frac{1}{4}$  to six fathoms, sandy bottom, under shelter of the islands. There is a small fishing village at the head of the bay, which is bordered by a sand beach.

**Doubtful Shoal.**—About 27 miles E.S.E. from cape Boung Quioua there is a shoal with 10 fathoms water; its position however is uncertain. Horsburgh places it in lat.  $17^{\circ} 50' N.$ , long.  $107^{\circ} E.$

**South Watcher**, situated  $7\frac{1}{2}$  miles E. by S. from cape Boung Quioua, is a barren and rugged rock, having 17 fathoms at less than a cable from its western side, decreasing to  $9\frac{3}{4}$  fathoms near the small islands near the cape.

**Hon-Tseu**, or Goat island (Sovel), lies near a promontory 1,410 feet high, and is distant 12 miles N.N.W. from cape Boung Quioua. When seen from the east it appears like two pointed hummocks, with a perpendicular cliff towards the north, and sloping to the south; it is surrounded by a reef, which extends more particularly towards the south and west. There is a rocky islet with a number of pointed peaks at 2 miles N.E. of Hon-tseu. The channel which separates Hon-tseu from the coast is very narrow, and the sea has been seen to break there. The soundings are 18 fathoms at 7 miles east, and 15 fathoms at  $2\frac{1}{2}$  miles north of the island.\*

**Tides.**—A short distance to the southward of Hon-tseu during a period of two weeks, only one tide was observed in 24 hours; excepting for 3 or 4 days, during which there were two tides per day. The range of tide was about 10 feet, but this rise decreased in proportion in going southward.

**Anchorage.**—At 6 miles westward of Hon-tseu is a small port open only from the North to N.W. The bottom is sandy, and it is sheltered from the East and N.E. by a rocky peninsula, connected with the coast by a narrow sandy isthmus, which projects half mile from the shore. Vessels can approach the shore according to their draught, and they will be sheltered from East (by the south) to N.W.

**The Coast** from cape Boung Quioua to abreast Hon-tseu is mountainous, but from the small port just mentioned it trends N.W. by W., and the shore is composed of sand occasionally interrupted by isolated mountains, the southernmost of which, named the Mamelles (Paps), is easily distinguished by its two summits, 1,656 feet high, but when coming from

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\* The description of the part of the gulf which follows is extracted chiefly from a manuscript by M. E. Ploix, ingénieur hydrographe, who visited the gulf in 1857, 1858, 1859, in the *Catinat*, the *Preigent*, and the *Primauguet*.

the south are liable to be mistaken for those of Hon-tseu. A large plain extends from the Mamelles to the foot of the mountains in the interior ; it appears well cultivated and covered with hamlets. At 2 to 4 miles from the shore are from 9 to 13 fathoms water over a bottom of muddy sand.

**North Watcher** (Hot) is a small island lying 10 miles N.W. from the Mamelles, 21 miles N.W.  $\frac{3}{4}$  W. from Hon-tseu, and 3 miles North of a prominent hill 2,033 feet high. To the south-east of it is a much smaller island, a short distance southward of which the sea has been seen breaking. There are  $6\frac{1}{2}$  fathoms water in the channel which separates the North Watcher from the coast, and  $11\frac{1}{2}$  to 14 fathoms at half a mile to the north and the east of the island.

**Matt Island.**—The coast from abreast the North Watcher trends N.W. by N. for 45 miles, thence N.N.E. 22 miles to Bien Shan island, thus forming a large bay, in which, at 2 or 3 miles from the shore, the depth is  $6\frac{1}{2}$  fathoms. A short distance before arriving abreast North Watcher, high mountains appear in the N.W. and N.N.W., and in front of this part of the coast lies Matt island, in lat.  $18^{\circ} 50' N.$ , and about 10 miles from the shore.

Matt island, formerly called Frakaki, is one mile long, N.N.W. and S.S.E., and precipitous on all sides except the south. At 2 cables off its west coast the depth is 11 feet to 14 fathoms.

Between Matt island and the coast are two rocks : the southernmost rock, distant about 4 miles S.W. of Matt, is 32 feet above the sea, and at a short distance resembles a junk under sail ; and the other, about one mile N.N.W. of the former, is low, flat, and dangerous. These rocks appear to be surrounded by shallow water ; in the middle of the passage between them and Matt the depth is about 8 fathoms.

**Gneu Island**, lying about 8 miles West of Matt island, and about 2 miles from the coast, consists of two hills separated by a neck of low land ; so that from a distance, with the island bearing South, it will appear like two islands. There is anchorage close to it in 6 or 7 fathoms water, and shelter from N.E. winds. The passage between the island and coast has not been examined, and there may be sunken rocks. On the coast about a mile south of Gneu island, lies Bourayne bank, fronting the entrance to a small river named Lacht-hoi.

**Lacht-Kuen\* or Manh-son River.**—About 5 miles north of Gneu island the coast recedes, and forms a bay, at the head of which are high mountains with a flat shore at their base. Lacht Kuen situated in this bay, in lat.  $19^{\circ} 4' 30'' N.$ , long.  $105^{\circ} 45' E.$  (approximate), affords

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\* See Admiralty plan :—Lacht-Kuen on Sheet No. 875.

good anchorage for small vessels; its entrance, which faces the S.S.E. and is not more than a cable wide, has on the west side a large rock, called Dog rock, which is connected with the shore by a narrow isthmus, only seen at low water.

This harbour, which is the best of those that have been explored on the coast of Tong King by M. E. Ploix, is sheltered from all winds, except those from the west, by rather high mountains.\* It is 2 to 3 cables in width, with about  $1\frac{1}{2}$  fathoms least water in it at low tide.

**Coal** is found at the village of Manh son, on the east bank of the river.

**Tides.**—It is high water, full and change, in Lacht Kuen at 10 h.; springs rise  $8\frac{3}{4}$  to  $9\frac{3}{4}$  feet.

**Bien Shan Island** separated from the coast by a narrow channel, is about 2 or 3 miles long north and south, and its northern part turns abruptly to the west and forms a bay, which affords anchorage for small vessels, sheltered from the westward. Larger vessels can anchor at the entrance of this bay, 2 cables from the fort on the point, but they will not be sheltered from the North to N.E. Coming from the southward the east side of Bien Shan can be approached to a mile, in  $6\frac{1}{2}$  to 8 fathoms water.

At less than a cable from the west side of the island are  $3\frac{1}{4}$  fathoms water. Extending some distance from the south point of the island is a bank, marked by a bamboo, between which and the bank along the coast is a passage with  $1\frac{1}{2}$  fathoms at low water, through which a vessel can run to sea. Almost abreast of a small village on the middle of Bien Shan the channel widens a little, and a vessel could, when moored, find here room to swing and shelter from all winds.

On the coast opposite Bien Shan is the mouth of the river Hien-Hoa, in which there is but very little water.

**Tides.**—It is high water, full and change, at Bien Shan at 8 h. 80 m.; springs rise about 10 feet.

**Mè Island**, in lat.  $19^{\circ} 21' N.$ , and 8 miles from the coast, is the most northern of a considerable group of islands, of different forms and nearly

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\* The rivers of Tong King, which flow into the sea between lat.  $20^{\circ}$  and  $21^{\circ} N.$ , have a rather long water-course, which is shown by the great amount of alluvion that has been deposited, and which is estimated to be about 328 feet per annum, being the amount which the bank of the river encroaches on the sea. At their entrance the fall of water is about 10 feet, and about 16 feet during spring tides if we can believe the inhabitants. The depth varies, no doubt, with the quantity of rain that falls into the basin, the melting of the snow on the hills, where the rivers find their source, and the force and direction of the wind on the coast; but 10 feet rise and fall may always be depended on, and vessels of a certain draught are always sure of being able to penetrate into the country.—*M. E. Ploix.*

all precipitous. The most western, which is flat and precipitous on all sides, is named Bong island. There is no anchorage in the middle of this group, for the ground is foul, the holding ground not good, and it is said that there are sunken rocks. The surroundings are 9 fathoms, rocky ground, about one mile eastward of Mè island, and 10 fathoms, rocky ground, at 2 miles to the northward.

**The COAST** from abreast Bien Shan island trends north 6 miles to Keun-bong river, in which the water is very shallow. Here the coast changes its aspect, the hills are at a greater distance from each other, and as the country with which they are surrounded is very low, they appear like islands. The bottom, which as far as this has been muddy sand, or sand, near the land, and muddy in the offing, now becomes rocky; the depths are about 5 to 7 fathoms at about 2 miles from the shore.

**Lacht Kiao.**—About 20 miles north of Keun-bong river, on a low beach, is the mouth of Kiao river, and 6 miles within, stands the arsenal of Hamatt, where the king's vessels are built. These pass across the bar without any cargo, with  $1\frac{3}{4}$  fathoms at high tides. This river communicates with the river Tran.

**Lacht Tran** falls into the sea, about 9 miles north of Kiao river, and on its bar is a depth of 2 fathoms at low water.

The anchorage off this river is in  $3\frac{3}{4}$  fathoms, mud, with Né island bearing N.N.E. a mile distant, and the extremity of a chain of notched mountains extending close to the sea bearing North.

**Tides.**—It is high water, full and change, at the mouth of Tran river at 8 h. 30 m.; springs rise about 10 feet.

**Hon Né**, 282 feet high, lying about 3 miles from the shore, and in lat.  $19^{\circ} 52' 30''$  N., affords a temporary shelter from north winds in about  $6\frac{1}{2}$  fathoms water.

**The COAST.**—To the northward of Né island is a chain of serrated mountains, and from them, the country for a considerable distance inland is entirely flat. As far as these mountains, the depths appeared to decrease in a regular manner on approaching the coast, but on leaving it they were irregular. From these mountains the land curves towards the east; nothing is to be seen but a low shore, relieved at a distance by trees which here and there appear to rise out of the sea. Fronting this shore are extensive banks, stretching in some places 5 to 6 miles eastward. On continuing along this part of the coast, mountains become visible in the north-west, but they are far inland.

A line of soundings of 8 to 11 fathoms, rock and sand, was obtained by the *Primauguet* at about 7 miles from the visible coast.

**SONG-KA.**—The mouths of the several branches of the Song-Ka form a great delta between the parallels of  $20^{\circ}$  and  $20^{\circ} 50'$  N.; they com-

municate with each other partly by natural means, and partly by canals constructed by the inhabitants. These canals, some of which are 50 to 200 yards broad, with little water, pass by several outlets into the sea, where they yearly deposit extensive sandbanks, varying in place, and height, and projecting 6 to 8 miles from the shore, having between them narrow and shallow passages. The Song-Ka is navigable as far as Mangho, on the frontier of Yun-nan.

**Lacht Dai**, the southernmost branch of the Song-Ka, falls into the sea to the eastward of the above serrated mountains. The *Pregent*, which anchored off its mouth at the end of December 1859, found on the bar a depth of  $6\frac{1}{4}$  feet, muddy sand, at low water, which would give, according to the tidal observations made along the coast, about 13 feet at high water, in ordinary weather. After crossing the bar, the depth increases to  $3\frac{3}{4}$  fathoms at the entrance. The missionaries assert that there are  $3\frac{1}{4}$  fathoms water before their house, which stands about 20 miles up the river.

**Kua Ba-Lacht-Dong.**—The *Primauguet* anchored in lat.  $20^{\circ} 12' N.$ , about 6 miles S.S.E. from the main branch of the Song-Ka, and rather near the banks to the west, having at less than a mile another bank to the north-east, at the west side of which terminates the canal which joins the branch west of Kua Ba-Lacht-Dong, this being the deepest channel to enter the country. The pilots state that there are  $5\frac{1}{2}$  feet at low water, and  $10\frac{3}{4}$  to  $12\frac{3}{4}$  feet at high water spring tides. The anchorage of the *Primauguet*, named Bong Keun, is considered the best for a large vessel; the banks by which it is surrounded sheltered it from heavy squalls from the N.E., which veered to the N.W. The holding ground is very good.

At 15 to 20 miles from Kua Ba-Lacht-Dong, and near the junction of a natural branch, which flows to the south and unites the Song-Ka and Kua-Lacht, the river becomes much broader. The fort Mom-rö is erected here, and opposite to it a toll-bar is established, which seems to be half way between the coast and Nam-Dinh, the second town of Tong King. Beyond Mom-rö the rivers, which discharge themselves into the sea by the several branches of the Song-Ka, unite and become one large river, which is no doubt deep.

Nam-Dinh stands on a canal of little depth, which joins the river about 3 miles from the town. The other part of this canal enters at Roukbo into Lacht Dai, a little below the old establishment of the French missionaries, and the important town of Ninh Binh.\* A little above Nam-Dinh are the old factories, and about 40 miles to the north-west lies Ha-Noi or Keicho,

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\* At Ba-Lacht the former limits of the coast, at the time of the commerce with Holland (about 200 years ago), is at present about 4 or 5 miles in the interior. Ba-Lacht is one of the three ports opened to French commerce by the treaty of Saïgon.

formerly the capital of Tong King. At Ha-Noi the Song-Ka is 5 to 8 cables broad, and has 17 feet water: with a rise of 30 feet in the summer, the river is then much wider. At Ha-Noi a strip of land has been ceded to the French government.

**Tides.**—From tidal observations made on board the *Primauguet* at the anchorage off the mouth of Kua Ba-Lacht-Dong, the establishment appeared to be 4 hours, and the rise of tide from 6 to 9 feet, the flood coming from the south, and the ebb from the north. It was difficult to determine if there was only one tide every day; but it is probable that it is the same here as at Yulinkan, on the south coast of Hainan, as stated by the pilots.

Horsburgh states that at the entrance of Kua Ba-Lacht-Dong there is but one flood and ebb in 24 hours; and when the moon is near the equator, twice every month, there is little or no tide, being then dead neaps. With the moon's declination the tides increase, and when she is in the tropical signs they rise most; only with this difference, that when the moon has north declination, the tide flows when she is above the horizon, and ebbs when she is below the horizon, making high water at setting, and low water at the rising moon; whereas, the moon having south declination, makes high water at her rising, and low water at her setting, the tide then flowing when she is below, and ebbing when she is above the horizon.

The tides are highest in the easterly monsoon, for the current which then sets along the coast of China to the westward is impelled by the strength of the wind through the channels on both sides of Hainan, producing an accumulation of water in the gulf; whereas the N.W. and westerly winds, which greatly prevail about this gulf in the other monsoon, tend to force the water out of it to the southward.

**Bacht-Ninh**, the capital of Tong King, is about 28 leagues up the Song-Ka, and consists of 500 or 600 houses, and a citadel, situated in a hilly neighbourhood. According to M. Ploix, it appears that vessels of about 10 feet draught can go as far as the capital, but that there are dangerous gravel banks before reaching it. The Dutch and Portuguese had commercial establishments here, but they have been destroyed. The silk and porcelain manufactures of Bacht-Ninh are the most valued of this part of the east. The population is estimated at 45,000.

**The COAST.**—From Kua Ba-Lacht-Dong the delta of Song-Ka extends in N.N.E. direction 28 miles to Do-Son peninsula, the highest part of which being 429 feet above the sea is conspicuous, the land at the back and around for a considerable distance being very low and flat. Nearly a mile from the south-east extreme of Do-Son peninsula lies Hon Daû, a small island 100 feet high. Between Kua Ba-Lacht-Dong and Hon Daû, there are depths of 8 to 10 fathoms at a distance of 7 miles from the shore.

From Do-Son point, the north-east extreme of Do-Son peninsula, the delta recedes and forms a bay about 10 miles wide and 8 miles deep, with 3 to 6 fathoms water in the entrance; shoals extend a considerable distance from the mouths of the several rivers that flow into the head of this bay.

The coast northward of this bay is composed of rugged mountains, forming deep bays, where a vessel drawing 11 feet water will find safe shelter.

**LIGHT.**—On Hon Daù island, is exhibited at an elevation of 148 feet above the sea, a *fixed* white light, visible between the bearings of S. by E.  $\frac{1}{2}$  E. and N.E., and in clear weather should be seen from a distance of 8 miles.

**Kua Kam.\***—The eastern limit of Kua Kam channel between Do-Son point and Hai Phong, is marked by four red buoys, and one white buoy, surmounted by a ball; the southernmost red buoy surmounted by a ball, marks a 9 feet patch on the outer bar of the Kua Kam; from this buoy Do-Son point bears W.  $\frac{1}{2}$  N. The western limit of this channel is marked by four black buoys.

**HAI PHONG**, the seaport of Ha-Noi, is situated on the banks of the Song-tam-bacht canal, and was opened to foreign trade in September 1875. The two principal forts are in the occupation of the French, the southern fort being the headquarters of the French garrison and the northern occupied by their commissariat. The foreign concession of land extends along the river side, being about  $1\frac{1}{2}$  miles long and a quarter of a mile wide.

The river at Hai Phong is  $2\frac{1}{2}$  cables wide and  $4\frac{1}{2}$  fathoms deep; a large number of vessels could be berthed there. Hai Duong, 21 miles west of Hai Phong, is the chief town of the province of that name, it is one of the largest in Annam, and possesses a citadel.

Between the delta and Hai-Duong, there is usually a current running out of the river at the rate of half to one knot. Above Hai-Duong in a narrow channel leading to Bacht-Ninh, the current runs  $1\frac{1}{2}$  to 2 knots an hour. The water of the river is thick and of a red colour.

**Anchorage.**—Vessels drawing 15 feet water can anchor in mid-channel, about a quarter of a mile off Hai Phong, abreast a creek communicating with the main river on which Ha-Noi is situated. The anchorage for vessels of war lies north-west from the northern fort, that for merchant vessels north and east.

**Supplies** can be easily obtained. Water for drinking is supplied at one dollar per ton, but it can be more easily procured, and of better quality, from the French commissariat, at 3 dollars per ton.

**Landing-places.**—In the narrow creek, on the bank of which is situated the custom house, are four wooden jetties, two on either side, one of which, on the east bank, is used as a public wharf.

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\* See Admiralty plan:—Kua Kam on sheet No. 875.

**Cargo.**—The only safe place for storage being at the custom house, cargo destined for Ha-noi is generally discharged into cargo-boats which take it up the river, or else forwarded by the steam launch which plies weekly between Hai Phong and Ha-noi.

The cargo-boats are incapable of carrying very heavy loads. Delivery is taken from alongside, coolies for the purpose being engaged by the voyage.

**PILOT.**—A European pilot is either stationed on Hon Daû, or is cruising between it and Apowan, and will take vessels up the Kua Kam branch of Hai Phong. Pilotage is compulsory, the charges being 3·05 dollars a foot for steam vessels, and 4·55 dollars a foot for sailing vessels. If no pilot come off, vessels should anchor to the eastward of Hon Daû, and send to Hai Phong. Care should be taken not to bring Hon Daû to bear southward of W.S.W., as the water shoals quickly within that bearing, from  $3\frac{1}{2}$  to  $2\frac{1}{2}$  fathoms.

A vessel drawing 17 feet can cross the bar of the Kua Kam at high-water ordinary springs; at neaps there are about 14 feet at high water, but the range of tide is very uncertain, as is also the time of high water, at full and change.

**Directions for Hai Phong from the southward.**—Having passed Hon Daû lighthouse (the light from which is not to be depended upon), bring Do-Son point to bear S.W. by W.  $\frac{3}{4}$  W. distant half a mile, and steer N.W.  $\frac{1}{4}$  W. for a distance of  $1\frac{1}{4}$  miles, passing between fishing stakes on either side.

When Petit Mirador (a hill over a point lying north-west from Hon Daû), bearing S. by E.  $\frac{1}{4}$  E., is in line with the western base of Do-Son hill, seen between a group of trees and the hill, steer in with this mark astern, allowing for a strong tide off the mouth of the Kua Kam river; when Petit Morne conique, which is easily recognised, bears W. by S.  $\frac{1}{4}$  S. the entrance of the Kua Kam river will be plainly visible to the eastward. Off the mouth of this river, the shores of which are very low, a sharp shoulder of the higher range of hills is in line with a low peak rising from the plain below; from this peak a table land extends westward, terminating in two conical shaped hummocks.

From this position a mid-channel course leads to Hai Phong.

Or another leading mark is, after passing the fishing stakes, to bring Hon Daû island in line with Do-Son point, bearing S. by E.  $\frac{1}{4}$  E., and keep it so until Petit Morne conique bears W. by S.  $\frac{1}{4}$  S., when proceed as before. This mark leads close to a sand-bank, north 2 miles from Do-Son point, and as this is the shoalest part of the channel, the soundings should be carefully attended to.

When a remarkable tree on shore comes in line with Petit Morne aplati, the sand-bank is passed.



In order to keep in the deep-water channel, Petit Mirador must be kept open east of the group of trees westward of Do-Son hill.

Vessels can anchor off Petit Mirador in 14 feet water, sheltered from north-east winds.

**LACHT HUEN.**—In 1849 H.M. ships *Columbine*, *Fury*, and *Phlegethon*, entered the East or Main channel of this river in chase of pirates. The entrance, in lat.  $20^{\circ} 47'$  N., is obstructed by a bar which they crossed at high water, carrying  $2\frac{3}{4}$  to 3 fathoms. Inside the bar the water deepens, and the shores are generally bold, except off the west side, where there is an extensive sandbank. The *Phlegethon* went up to the small town of Fafung, and had not less than 5 fathoms water. Wood was plentiful, but little water or provisions. The natives said there was coal in the vicinity, but their accounts were vague.

The French ship *Pregent* entered this channel in 1859, and at that period there were 11 feet on the bar at low water.\* It is preferable to the Balat, Lak, or Dai rivers, and its bar is only one mile from the coast. Vessels of greater draught than 11 feet can anchor 2 miles outside the bar, when waiting for a favourable moment to cross it; this anchorage is only open from S.E. (round south) to W.S.W.

**Tides.**—During the *Pregent's* stay in the Lacht Huen, there was only one tide every 24 hours; during neap tides, however, there were 3 or 4 days during which there were two tides per day, but they were weak, and then one tide succeeds the other, so that the establishment at full and change, is alternately at 1 h. p.m. and 1 h. a.m. every 14 days. The rise and fall was about 10 feet.

**Directions.**—When bound to the above rivers during the south-west monsoon, keep along the coast of Cochin China as far as cape Choumay, or to Tiger island; from thence steer to the northward, giving the west coast of Hainan a proper berth, the approach to which will be indicated by the quick decrease in the soundings, when getting near its contiguous banks, which should not be approached nearer than the depths of 15 to 20 fathoms. Having reached lat.  $19^{\circ}$  N., and in 28 to 30 fathoms, if Hainan island is not seen, steer N. by W. for the Norway islands, which are of moderate height, and of which the most southern is said to be in lat.  $20^{\circ} 35'$  N. But the course steered and the approach to the land must be governed by the tides or currents, which are frequently found to set out of the gulf.

The branches of the Song Ka should not be entered without local knowledge, as the channels frequently change.

On leaving the Kua Ba-Lacht-Dong or the Lacht Huen during the north-east monsoon, steer between S.E. and S.E. by E., in order to sight Hainan, the north-west part of which must be avoided by not coming

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\* Mer de Chine, 1st Part, page 303.

under 20 fathoms towards the sands, which are said to stretch out 18 or 20 miles. During the monsoon, when it is blowing outside from the N.E., the wind inside the gulf is frequently from the East.

**Port Ounong** is on the east side of entrance of the East channel into the Lacht Huen. Off it is a rock named the Ninepin from its shape. At three-quarters of a mile W. by S. from the Ninepin is a dangerous rock with about 11 feet on it, and 8 fathoms close around it at low water. Near this are the great and little Ounong harbours, with insignificant villages in them. H.M.S. *Columbine* anchored outside, with the great harbour bearing N.E. by E.  $1\frac{1}{2}$  miles, and the Ninepin E.  $\frac{1}{2}$  S.

**Apowan Harbour** lies about E. by N. 10 miles from Hon Daü. It is reported to be a good typhoon harbour. The soundings inside are from 4 to 5 fathoms (soft mud), shoaling to 6 feet towards the village. The entrance is about  $2\frac{1}{2}$  cables wide N.N.E. and S.S.W., with 4 to 6 fathoms water.

The *Egeria* anchored in  $3\frac{1}{2}$  fathoms, with centre of village bearing N.E. by E.  $\frac{1}{2}$  E.; left extreme of island to the south-eastward S.E.  $\frac{1}{4}$  S.; right extreme of island to the south-eastward S.  $\frac{3}{4}$  E.; left extreme of island to south-westward S.W.  $\frac{3}{4}$  S.

Vessels from the south-eastward, after passing Norway islands, steer about N.W., until a remarkable high nipple-shaped rock bears East, thence N.E., for a cone-shaped peak which stands on the point at the east side of the entrance. The west entrance point consists of low rugged black rocks which will appear overlapping the east entrance point as it is approached on a north-easterly course.

There is another entrance to Apowan harbour from the south-eastward by which the *Egeria* entered, having from 9 to 6 fathoms water, and passing between some high precipitous islets about three-quarters of a cable apart.

This entrance, however, is unsafe, as there are said to be sunken rocks in the neighbourhood.

**Tides.**—It is high water, full and change, at Apowan, at 5 h.; springs rise 11 feet, neaps 6. There are 12 hours ebb and 12 hours flood at Apowan.

**Chai-le-pi** is an extensive group of rocks, some of which are always covered, situated E.  $\frac{1}{4}$  N.  $19\frac{1}{2}$  miles from the Ninepin rock,\* and about 5 miles east of the Norway islands.

Between the Chai-le-pi and Ninepin rocks is the entrance of a remarkable bay, about 13 miles deep named Fietze-lung, extending in a north-easterly direction, and filled with islets and rocks of limestone formation.

**The NORTH COAST** of Tong King gulf, as far as Hainan strait, appears to be little known. It may be said to be bounded by banks and rocks which extend a long distance off shore; some large islands were visited by the *Columbine*, *Fury*, and *Phlegethon*, when in pursuit of pirates.

\* Mer de Chine, 1st Part, page 306.

**GAU-TAU OR PIRATE ISLAND** is the largest of a cluster of islands situated about 13 miles N.E. by E. from Chay-le-pi. It is about 6 miles long north and south,  $2\frac{1}{2}$  miles broad, and level except near its north end where there is a high conical hill; the south end is composed of several red precipitous cliffs about 100 feet high. A reef, awash at high water, nearly  $1\frac{1}{2}$  cables long, N.E. and S.W., lies about 3 miles from the north-west point: this point may be rounded close to. There is a reef bearing West, distant 4 miles from the anchorage in Sha-pak-wan, the bay on the western side of the island. In the centre of this bay, about  $1\frac{1}{2}$  miles from the shore, is a cluster of dangerous rocks awash at low water, bearing S.W. by S. from its north-west point; and a reef, breaking in bad weather, extends for about  $2\frac{1}{2}$  cables to the south-west from the south-western point of the bay.

There is a channel with 2 or 3 fathoms at low water, between Gau-tau and the island three-quarters of a mile northward of it, but a reef extends along the north-east shore of Gau-tau. The best channel is found by keeping close to this reef.

South-west of Gau-tau is an archipelago of small islands and pyramidal rocks, covered with thick jungle interspersed with patches of grass; they rise to a height of about 130 feet, and are steep to; numerous caverns are to be found on their shores, some forming natural arches, having a depth of from 3 to 9 fathoms underneath them. There are some rocks awash, bearing S.S.E. about  $2\frac{1}{2}$  cables from the southern islands of this group.

**Chung-lan island**, the next in size to Gau-tau, is about 4 miles long N.E. and S.W., and  $1\frac{1}{2}$  miles broad.

A ridge of hills with an average height of about 500 feet, and sloping towards the sea on both sides, occupies the centre of the island and terminates in its south end in two or three abrupt precipitous cliffs of a red colour, about 200 or 300 feet high.

**Anchorage.**—There is a safe and spacious anchorage for vessels of moderate draught between Gau-tau and Chung-lan islands, sheltered by Chung-lan to the eastward, by Gau-tau to the westward, and by three or four smaller islands to the northward. H.M.S. *Egeria*, 1876, entered it by a channel half a mile wide, which separates the south point of Chung-lan from Gau-tau island. From the eastward Chung-lan was coasted along about 2 miles distant in 15 and 13 fathoms water, and when the passage between the two islands was well open, a N.N.W. course was steered through it, avoiding the south point of Chung-lan, where a sunken reef on which the sea was breaking extends in a south-westerly direction. The soundings varied from 10 to  $7\frac{1}{2}$  fathoms in mid-channel, decreasing to 6 fathoms as the vessel proceeded. The deepest water in this harbour is close along the Chung-lan shore; towards Gau-tau, however, and to the

north-westward, towards a smaller island in that direction, the water shoals to  $2\frac{1}{2}$  fathoms fully a mile and a half from the beaches.

The *Egeria* anchored off Chung-lan island, abreast a patch of black rocks on the beach, with a quoin-shaped island bearing N.N.E.  $\frac{1}{4}$  E., the north extreme of Gau-tau island N.W. by W.  $\frac{1}{4}$  W., the conical peak on Gau-tau N.W. by W., the west side of the entrance S.  $\frac{3}{4}$  W., and the east side S. by E.  $\frac{1}{4}$  E.; deeper water, however, was found farther to the north-eastward to within 300 or 400 yards of the beach.

There were only a few inhabitants on these islands; pirates make periodical raids and destroy the houses and crops. The ground appears fertile, and has been cultivated in patches; the hills are almost denuded of trees, a feature by which this group may be distinguished from the islands to the south-westward, which are all thickly wooded along their summits.

The anchorage on the west side of Gau-tau island is considered unsafe in bad weather on account of the heavy sea that enters.

**Echun island** situated about 13 miles north-east of Chung-lan island, is  $2\frac{1}{2}$  miles long and  $1\frac{1}{2}$  broad, and lies about 2 or 3 cables north of Tycham island, to which it is apparently joined: both islands appeared to be foul all round. Between Tycham island and Chung-lan, there is a group of small islands, the most conspicuous of which, Chusan, is of a pyramidal shape: it is the northern island of the group, and lies N.N. E.  $\frac{1}{2}$  E. 5 miles from Chung-lan island.

**Lowseu island** situated 5 miles N.W. from Tycham island, affords good anchorage in 7 fathoms, mud, off a little sandy bay on the south-west side of the island.

**The Coast** from abreast Gau-tau island trends north-easterly for a distance of 34 miles to Choukshan harbour, the boundary between China and Cochin China; thence in an easterly direction for 11 miles to cape Pahklung, which is a bold promontory, having behind, a range of mountains 5,000 to 7,000 feet high.

**Choukshan harbour**, which is formed by shoals on the east and a low point on the west, has 5 fathoms water in it; pilots may be obtained. The *Columbine* and *Fury* anchored off the shoals, with cape Pahklung bearing N.E.  $\frac{1}{2}$  E., distant 6 miles.

**Pahklung or Pak-su-hai Rock**, lying S. by W.  $\frac{1}{4}$  W. 10 miles from cape Pahklung, is awash at high water, but being so far off the coast, makes the approach to Choukshan harbour dangerous at night.

**PAK-HOI ANCHORAGE**, situated E.  $\frac{1}{4}$  S. 41 miles from cape Pahklung, is protected by A-long, a large sand bank, nearly awash at low water, on the north side of the anchorage. Northward of A-long bank, between Pak-hoi and the opposite shore, about 8 miles distant, there

are several sand banks (some of which dry at low water) extending in a general east and west direction. Pak-hoi was opened to foreign trade in April 1877.\*

**Directions.**—Approaching Pak-hoi from the southward the soundings decrease gradually towards Kwan-tau point, within half a mile of which there are depths of 23 feet. Vessels bound to Pak-hoi anchorage should, after passing Kwan-tau point at a distance of half a mile, steer North until Nautilus hill, 340 feet high,—about three-quarters of a mile to the northward of Kwan-tau point—bears East, when a N.E.  $\frac{1}{2}$  N. course should be steered until the sandy point on which stands Tykok village bears East, thence close around the outer extreme of the fishing stakes extending from Tykok for the anchorage abreast the custom house, in 4 fathoms, with Tykok point bearing S.W. by W.

**Tides.**—The following particulars concerning the tides at Pak-hoi anchorage are taken from observations extending over a period of forty days by the *Nautilus*, during the months of February and March 1877.

The flood stream sets to the north-east and the ebb to the south-west. From one day before, to five days after full and change, the average rate of the flood stream is  $1\frac{1}{2}$  miles an hour, and that of the ebb one mile; from five days after to one day before full and change, both ebb and flood run at the rate of half a mile an hour.

High and low water occur twice in the 24 hours during the period of the greater tides, or one day before to five days after full and change when the rise is about 12 feet; with the lesser tides there is only one high water in the 24 hours, the flood continuing 14 and the ebb 10 hours.

**Climate, Winds.**—The rainy season at Pak-hoi is from January to June, but it does not rain uninterruptedly or heavily; from January to April heavy northerly gales blow frequently and rise suddenly, lasting sometimes three days. Warning, however, of these gales will be given by the barometer rising, and the opposite coast becoming visible, which, under other circumstances, cannot be distinctly seen from Pak-hoi.

Typhoons occur occasionally from June to October; their centres, however, are said always to pass south of Kwan-tau peninsula.

**Supplies** may be obtained at Pak-hoi at moderate prices.

**Water** can be obtained from a well 400 yards from the shore; it is, however, unwholesome, and can only be used for cleansing purposes.

**Kwan-tau** is the name given to the high land at the west extreme of the peninsula forming the south side of Pak-hoi anchorage; it is a barren rugged range of hills, from 300 to 500 feet high, extending in a N.N.E. and S.S.W. direction for about  $1\frac{1}{4}$  miles.

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\* See Admiralty plan of Pak-hoi on sheet, No. 875.

To the eastward of this land is low, and the water shoal for a long distance off shore, to avoid which when approaching Pak-hoi from the southward, Kwan-tau hills should not be brought to bear north of N. by E.

About 12 miles south of Kwan-tau are numerous fishing stakes, in from 6 to 8 fathoms water.

- **GUIE-CHAU ISLAND (Wy-chau)**, 280 feet high, situated about 24 miles south from Kwan-tau point, is  $4\frac{1}{2}$  miles long north-east and south-west, and 3 miles broad. The south and west sides of Guie-chau are composed of hills rising abruptly from the water and sloping gradually to the north-east shore. Mount Hümpel, the summit, is near the south-east extreme of the island.\*

The north-east point of Guie-chau should not be approached nearer than 2 miles; and at night, when in the vicinity of this island, do not shoal the water less than 10 fathoms.

**Nam-Wan (south harbour)**, situated on the south side of Guie-chau, is about a mile in extent, with depths of 6 to 4 fathoms, good holding ground, and sheltered from all winds except those between S.S.E. and E.S.E. The entrance of Naw-Wan is  $1\frac{1}{4}$  miles wide; it is, however, contracted to 6 cables by a shoal of 13 feet, which extends nearly half a mile in a south-easterly direction from Petit Cochon, a small rocky islet 95 feet high, on the east side of the entrance. From the east entrance point a shoal of 13 feet extends 2 cables in a southerly direction; and from the west entrance point a shoal of 13 feet extends nearly half a mile in a south-easterly direction.

On the beach at the head of Nam-Wan harbour there is a small village, a short distance westward of which, and about half way up the cliff, stands a Chinese temple, conspicuous from its yellow colour against the dark background.

**Population.**—The population of Guie-chau island in 1877 amounted to about 4,500, the principal occupation being the cultivation of sugar-cane and bananas.

**Winds and Weather.**—In Nam-Wan harbour southerly winds seldom blow home, and are never very strong. Typhoons may be expected in the month of June; they are considered, however, to occur most frequently in September, but seldom with sufficient strength to endanger vessels at anchor in the harbour.

**Chaye-une Island**, about 500 feet high, lies about S.E. distant between 6 and 7 miles from the south-west point of Guie-chau. It is a

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\* See Admiralty plan of Guie-chau on sheet, No. 875.

mile long and has a small town in a valley in the middle of the island. Chay-une affords no anchorage.

**Shoal.**—A shoal, on which H.M.S. *Lily* obtained 6 fathoms water, lies south-east from Chay-une island, distant about 18 miles, and is said to extend to within 11 miles of Chay-une island. A depth of 12 feet water is reported to exist on this shoal.

**BACHT-LONG-VI**, or Nightingale island, in lat.  $20^{\circ} 8' N.$ , long.  $107^{\circ} 46\frac{1}{2}' E.$ , from its position appears to form a good landmark for vessels bound to the northern part of the gulf. It is 2 to 3 miles in length, N.E. and S.W., high, with a flat summit, and its sides are almost everywhere precipitous, except to the south-east, where there are some huts along the shore. Towards the north-east it descends with a gradual slope, and terminates in a low, sandy, and projecting point, which shows white when the sun's rays fall upon it, and off which are sunken rocks, and breakers to the distance of half a mile. The sea also breaks some distance from the south-east point of the island; there are 6 to 12 fathoms water at 2 miles from its western shore.

**CAPE CAMI**, the south-west extreme of Lien-chew peninsula and the north-west entrance point of Hainan strait, is a low sandy point backed by sand hills with patches of scrub. From the cape a rocky ledge which dries, extends 8 cables, and shallow water with irregular soundings and rocky bottom 2 miles in a south-westerly direction; there are soundings of 15 and 13 fathoms about 5 miles from the cape.

H.M.S. *Lily* rounded the cape, at a distance of  $1\frac{1}{2}$  miles, in not less than 7 fathoms water.

Strong tide rips and heavy overfalls, having the appearance of breakers, extend a considerable distance from the cape.

Between cape Cami and Noo-shik hill regular sounding in 9 fathoms water will be obtained, at a distance of 5 or 6 miles off shore.

**Dangerous banks.**—A sand-bank, with 6 fathoms water on it and probably less, lies about 8 miles in a W.S.W. direction from cape Cami: it appears to be a narrow ridge, as 13 fathoms, mud, was found close-to on either side.

About 12 miles west of cape Cami there is a sand bank, upon which as little as  $3\frac{1}{2}$  fathoms are said to exist, it is apparently a ridge extending north and south for several miles with 13 fathoms on each side; the *Egeria* got  $6\frac{1}{2}$  fathoms, with Pingmar hill bearing S.  $43^{\circ} W.$ , and Laam-koo hill, S.  $12^{\circ} E.$  (the former has an abrupt appearance as of two hills; the latter is a long low hill sloping towards the east and west from its centre, and highest part).

A mud-bank, with from 7 to 9 fathoms water on it and probably less, apparently extending some distance, lies W.N.W. about 15 miles from cape Cami.

A sand-bank, apparently steep-to, extending 7 miles in an east and west direction, and with a depth of water on it from 5 to 6 fathoms and probably less, was discovered about 26 miles W.  $\frac{3}{4}$  S. from cape Cami.

**Anchorage.**—Good anchorage may be obtained in 5 fathoms, mud, with cape Cami bearing S.E. by E. distant one mile; shelter from N.W. winds may be found in 7 fathoms, sand and mud, with cape Cami bearing N.W.  $\frac{1}{2}$  W. distant about 4 miles. The *Columbine* anchored in 12 fathoms, with the cape bearing N.E. by N., distant 4 miles.

**The Coast** of the peninsula from cape Cami appeared to trend N. by W. for about 30 to 40 miles. Noo-shik hill, at 22 miles from the cape, will be easily recognized from its isolated position. To the northward of this hill is a point with rocks off it, towards which the pilots would not approach nearer than the depth of 6 fathoms, or a distance of about 6 miles.

**At night**, when approaching the north-west side of Tong-King gulf, do not at any part shoal the water to less than 13 fathoms.

Between cape Cami and Tycam island the deepest water is about 18 fathoms, and thence to a depth of 12 fathoms the water shoals very gradually.

**Tidal Streams.**—H.M.S. *Lily* in 1876 found the tidal streams in the Tong-King gulf to set as follows: On the eastern side, near Lieu-chew peninsula, North and South; between Guie-Chau island and Pak-hoi, N.N.E. and S.S.W.; on the north-west side of the gulf, N.E. and S.W.; and near the south-west coast of Hainan N.W. and S.E., appearing at this last position to follow the trend of the coast line. The flood comes from the south, the ebb from the north.

On the parallel of Hoi-how, the tidal streams of Hainan strait were experienced as far west as Nightingale island.

The streams changed their directions at intervals of about 12 hours running from half a knot to three knots per hour, the direction of the wind not appearing to affect them.

Between Gau-tau and Norway islands, and Hainan strait the currents are reported to run one to 2 knots an hour in a north-easterly and south-westerly direction. The *Egeria* experienced in April a set of about 28 miles S.W.  $\frac{1}{2}$  W. in a run of 24 hours from the entrance of Hainan strait to Gau-tau island; there had been a fresh north-easterly breeze during the passage.



## HAINAN ISLAND.

**HAINAN ISLAND**, bounding the Tong King gulf to the eastward, is about 155 miles in extent, N.E. and S.W., and about 90 miles in breadth. It is in most parts very high uneven land when viewed from seaward, but in the interior there are many level districts, cultivated with rice, sugar-cane, areka or betel-nut trees, and tobacco. These cultivated plains are separated from each other by lofty mountains, covered with impenetrable forests, through which the natives have cut narrow passes in the most accessible parts, to enable them to go from one district to the other. The island forms part of the province of Quang-tong, and is subject to the Chinese, who hold all the places of profit or of consequence, keeping the inoffensive aborigines in a state of abject poverty. Kien-chu or Kiung-chau, the capital of Hainan, and a treaty port, stands on the banks of a river on the north coast of the island.

The south-east and south coasts\* of this island are bold to approach, with soundings generally from 25 to 35 fathoms very near or close to the headlands, deepening to 65 or 70 fathoms about 15 miles off; and in some places these soundings extend 18 or 20 miles off shore.

The south coast is indented with several fine bays, affording good anchorage or shelter from north-east monsoon; each of these bays may be considered a safe harbour during that monsoon, but they are partly open to southerly winds.

The north-west coast is little known to Europeans. Some shoal banks are said to extend 18 or 20 miles from the west coast; they may be approached to 16 or 18 fathoms, or to 15 fathoms in some places, the soundings being regular towards them.

Capt. Ross remarks :—"In the few communications we had with the people on Hainan, they were found to be civil, and ready enough to part with refreshments when the mandarins were not present; but whenever the latter appeared, they proved as arbitrary and rapacious as we found them on the coast of China. From what I observed, I am inclined to believe that a number of bullocks may be obtained, as they appeared to be plentiful, although small. There are numerous fishing-boats belonging to the island, built of hard and heavy wood, instead of the fir which the

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\* The survey of the south-east coast of Hainan was made by Captain Daniel Ross, I.N., on board the surveying ships *Discovery* and *Investigator*, in 1817. It commenced in Gaalong and Yulinkan bays, where base lines were measured on the shore; after which, a chain of triangles was carried on from the East Brother island to False Tinhosa island, and in that space three bases were measured by sound, and every care taken to render the survey correct. The other coasts of the island not having been thoroughly surveyed, should be approached with caution.

Chinese boats are built with, and they sail fast ; many of them go every year on fishing voyages for two months, and navigate to seven or eight hundred miles from home, to collect the bicho de mer, and procure dry turtle and sharks' fins, which they find amongst the numerous shoals and sand-banks in the south-east part of the China sea. Their voyages commence in March, when they visit the northern banks, and leaving one or two of their crew and a few jars of fresh water, the boats proceed to some of the large shoals nearly in the vicinity of Borneo, and continue to fish until the early part of June, when they return and pick up their small parties and their collections. We met with many of these fishing boats about the shoals in the China sea."

### EAST COAST.

**CAPE BASTION**, the south extreme of Hainan is in lat.  $18^{\circ} 9\frac{1}{2}'$  N., long.  $109^{\circ} 33\frac{1}{2}'$  E. It is the south point of a high peninsula 4 miles broad, bold, of rocky appearance, and visible from a distance of 25 or 26 miles in clear weather. About 8 or 9 miles southward of it, the depths vary from 40 to 45 fathoms, mud and sand, gradually decreasing to 27 fathoms about a mile from the land.

**GAALONG BAY.**—At  $2\frac{1}{2}$  miles eastward of cape Bastion is a black rocky point, named cape Rhinoceros, forming the west extreme of Gaalong bay, which is about 5 miles wide, and 3 miles deep. In the eastern part of the entrance are two round islands, named East, and West Brother, and near the middle of the northern part of the bay lies St. Peter, or Middle island ; in the north-west part there are some rocks above and under water, and the bottom along the western side of the bay is generally foul.\*

The usual anchorage is between Middle island and the eastern shore of the bay, in 8 fathoms water, over sand and mud. The *Discovery* anchored with the East Brother bearing S.S.E.  $\frac{1}{2}$  E., the West Brother S.  $\frac{1}{2}$  W. nearly, and the two extremes of the bay S.E.  $\frac{1}{4}$  S. and S.W.  $\frac{1}{2}$  W., distant about three-quarters of a mile off the eastern shore. In this position much swell was experienced with a south-east wind, from which it would appear to be a very unpleasant anchorage during the south-west monsoon. A small vessel would find tolerable anchorage close on the north side of Middle island, in 4 or 5 fathoms, and be in some degree sheltered from the swell ; the deepest water is near the island, bottom mud, but the depth decreases to 3 fathoms half-way towards the north shore of the bay, and the bottom is sandy.

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\* See Admiralty plan of Gaalong bay, No. 1,019 ; scale,  $m = 1\cdot6$  inches.

Horsburgh remarks that vessels wintering in this bay during the north-east monsoon moor in 7 or 8 fathoms, dark sand and mud, at the north-east part, with Gaalong village bearing E. by S. about a mile; but the reef that fronts the south side of the little bay contiguous to the village must have a berth. Here vessels are sheltered from all winds, by the circumjacent high land, except those between South and S.W., which force a considerable swell into the bay. A small vessel might moor close on the north side of Middle island, and be sheltered from all winds.

**Water.**—Horsburgh says that northward from the usual anchorage there is a white sandy beach, and a rocky part of the shore separates it from the small bay to the eastward; on the north-west side of these rocks fresh water can be procured from a small run, that terminates in a pool close to the beach. The tide rises here about 4 or 5 feet. Captain Ross did not perceive any good watering-place about the anchorage; but a short distant westward of Middle island, and a few yards from the beach there is a large pond of fresh water, and many buffaloes and bullocks were seen feeding near. Plenty of firewood was obtained in a small cove near the anchorage.

**Directions.**—The depth of water close outside the Brothers varies from 25 to 21 fathoms, and within them from 15 to 12 fathoms, decreasing gradually to 6 or 8 at the anchorage. With a leading wind the bay may be entered by any of the three channels; that between the East Brother\* and eastern shore has from 15 to 18 fathoms, coarse sandy bottom; but as a reef projects from the north-east end of the Brother, it will be prudent to keep in mid-channel, or rather nearest to the main. The channel between the Brothers is safe, the depths in it being from 16 to 19 fathoms, blue clay; but the western channel is the most convenient with a working wind, being nearly 3 miles wide, with 18 or 20 fathoms water from the West Brother, until close to cape Rhinoceros, the south-west point of the bay; inside the depths are 15 to 11 fathoms, good anchoring ground. A short distance outside the Brothers the depths increase to 35 and 40 fathoms. After entering the bay by either channel, work or sail up between Middle island and the eastern shore, which is safe to approach, and anchor opposite the village.

**LEONG-SOY BAY.**—Leong-soy point, bearing N.E. by E.  $\frac{1}{4}$  E.  $23\frac{1}{2}$  miles from the East Brother, is formed by several high hummocks, having a sandy plain to the northward, and when seen at a distance of 16 or 17 miles appears like an island. The coast between this point and Gaalong bay forms a considerable concavity, with several sandy beaches,

\* Captain Ross made the East Brother in lat.  $18^{\circ} 11' 30''$  N., long.  $109^{\circ} 41\frac{1}{2}'$  E., or  $39' 40''$  East of Pulo Sapatu, which applied to the *Rifleman's* long. of the latter island, would place the East Brother in long.  $109^{\circ} 45' 37''$  E.

and near the western shore of the curve are two small islands, but they are too small to afford shelter for vessels anchoring between them and the coast. At 2 miles westward of Leong-soy point is another conspicuous point, with a hill of a sugar-loaf shape; and about 2 miles farther to the north-west are several dry rocks, steep-to, which extend three-quarters of a mile from another point. At  $1\frac{1}{2}$  miles N. by W. of this latter point is a narrow and very shoal passage, which leads between two sandy points into an extensive salt-water lagoon, of an oval form extending to the N.E., but coral and sand banks render its navigation difficult even for boats. The town of Leong-soy, the residence of a mandarin, is 7 miles from the head of the lagoon. Farther to the westward is another considerable town, named Tong-kin.

Horsburgh states that vessels will be well sheltered in Leong-soy bay from N.E. and northerly winds, by anchoring well in towards the eastern shore in 7 or 8 fathoms, with Leong-soy high rocky point, off which a reef projects some distance, bearing E.S.E.

Captain Ross remarks:—There is no anchorage between Leong-soy and Gaalong, where a ship could safely ride in the southerly monsoon. The depth of water at 10 or 11 miles to the southward of Leong-soy point is about 50 fathoms, gradually decreasing to 17 fathoms; after which it decreases rapidly to 9 or 10 fathoms, and then regularly towards the beaches. The dry rocks above mentioned are steep-to, having 15 fathoms about half a mile from them, and the water is deep close around the whole of Leong-soy point, as we had from 25 to 21 fathoms about a mile off.

**Water** of good quality can be obtained from the point near the anchorage.

**TIEN-FUNG**,\* or Sail rock, in lat.  $18^{\circ} 26\frac{1}{4}'$  N., long.  $110^{\circ} 7'$  E., and bearing N.E. by E. from Leong-soy point, is one of a cluster of large rocks above water, which, from its being higher and whiter than the others, has acquired the name of Sail rock. Horsburgh describes it "as being a rugged peaked rock, appearing like a Chinese junk in some views: the depths about 3 miles outside of it are 35 to 38 fathoms; and there is a channel with 10 to 13 fathoms between it and the shore, from which it is distant 4 miles."

**The COAST** between Leong-soy point and Tinhosa island, about 29 miles to the north-east, forms a large bay, in which may be seen many sandy beaches and very high land near the shores, but it affords no safe anchorage during the southerly monsoon. On the eastern shore of the bay stands the town of Munchaw; and in the vicinity of the coast, near the middle part of the bay, are three prominent peaks of an elevated range of

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\* Tien-fung of the Chinese, or sky-wind.

mountains, the centre one being the most pointed, and a little higher than the others : this lies near the sea, and, at a considerable distance, is sometimes mistaken for Tinhosa island. Captain Ross made it in lat.  $18^{\circ} 38' N.$ , long.  $110^{\circ} 7' 15'' E.$ , which is about 2 miles in shore, and may be seen 35 or 40 miles off; when it bears N.W. by W. it is in line with Saddle island. Farther inland, in about lat.  $18^{\circ} 56' N.$ , there is another mountain of similar appearance to the former, but more elevated; it was seen bearing W.S.W. nearly 90 miles distant, then forming in three peaks or sugar-loaves.

Besides the Sail rock there are three small islands in this bay, the most western of which, named Saddle, has two hummocks on it, and bears N. by E.  $\frac{3}{4} E.$ , distant  $8\frac{1}{2}$  miles from Sail rock. The most eastern island, Nankin, is in lat.  $18^{\circ} 38' N.$ , long.  $110^{\circ} 19' E.$ ; and the third lies 4 miles to the westward of the latter. All three islands are about  $1\frac{1}{2}$  miles off shore, but they are too small to afford shelter from the sea, although the depth of water about them is moderate, being from 7 to 10 fathoms, and 2 miles to the southward it varies from 12 to 16 fathoms, on a sand and mud bottom.

About 5 miles south-west of Saddle island lies Hou-tou-wan inlet, but it is too shallow for an anchorage; and about a mile east of Nankin island there is a small lagoon with a bar on which the sea breaks.

In moderate weather, sailing along the coast, bamboos may frequently be seen standing erect above the surface of the sea; they are the buoys of drift nets, which the fishermen place sometimes a long distance from the land, to catch flying fish.

**Nam-Hoi-Chau (Munchau)** anchorage lies 2 miles north of Nankin island. A small unnavigable river, having two remarkable rocks at its entrance, leads to the town of Munchau. The anchorage off this river is considered unsafe.\*

**Supplies.**—Fresh provisions can be obtained at Munchau, and fish are plentiful in the bay.

**Water** can be obtained from a well on the south extreme of a sandy spit.

**Ty-chau or Tinhosa island**,  $2\frac{1}{2}$  miles in extent, in a north and south direction, is formed by two high hills, united by a narrow sandy isthmus, which covers at high water spring tides. The southern hill (about 600 feet high) is the highest, and its summit is in lat.  $18^{\circ} 39' 45'' N.$ , long.  $110^{\circ} 28' E.$ , determined by angles from the East Brother.

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\* See Admiralty sketch of Nam-Hoi-chau anchorage on Sheet No. 1,019; scale,  $m = 2$  inches.

**Water and Firewood** can be obtained at Tinhosa.

Horsburgh remarks :—The west side of Tinhosa being of a concave form, with soundings of 8 to 14 fathoms between it and the Hainan shore, good shelter may be found against all winds, excepting those from the South or S.W.: it therefore forms a good harbour in the north-east monsoon; the entrance to it is about 3 miles wide, between the south-west point of the island and the opposite shore. The *Valentine* took shelter here, after being driven from her anchors close to the Grand Ladrone, early in October, 1763, and sailed in March following for Macao. Tinhosa is steep-to on the outside; when passing it about a mile distant, we had 35 fathoms soft ground, and about 3 or 4 miles to the eastward of it 60 and 65 fathoms.

Captain Ross remarks :—The channel between Tinhosa island and the coast is about 3 miles wide, and the depth of water varies from 9 to 14 fathoms, excepting on a spit of sand which extends about a mile from the west side of the north hill of the island, and on which we found as little as  $4\frac{1}{2}$  fathoms, where we anchored, with the island bearing from N.N.E.  $\frac{3}{4}$  E. to S.S.E.  $\frac{3}{4}$  E., distant about half a mile; Nankin island bore S.W. by W.  $\frac{3}{4}$  W., touching the point opposite Tinhosa. The water was deeper near the island, where we had 5 fathoms. On the north of the island the mid-channel depth is 14 fathoms, decreasing a little towards Hainan, and the shore is not so high as to the southward. The depth of water at 7 or 8 miles to the southward and eastward of Tinhosa is about 55 fathoms, and the island appears to be quite free of danger, excepting a few rocks on the east side close to the low sand which connects the two hills. We did not meet with fresh water on Tinhosa.

**False Tinhosa**, in  $18^{\circ} 49' N.$ , long.  $110^{\circ} 36' E.$ , and 9 miles N.E. from Tinhosa, is of small extent and middling height, and when viewed from the southward has a rock like a pillar at its eastern extremity. The island may be seen in clear weather from a distance of 23 or 24 miles.

The *Discovery* and *Investigator* passed between the coast and False Tinhosa in a good channel, and anchored near the latter, in 17 fathoms water, with the island bearing from S.S.E.  $\frac{3}{4}$  E. to S.E.  $\frac{3}{4}$  E., and the dry rocks extending to E. by S., distant off False Tinhosa about a quarter of a mile, and  $1\frac{1}{2}$  miles off the Hainan shore.

**The COAST** from False point, abreast of False Tinhosa, trends in a north-easterly direction about 55 miles, to Ton-con point, close to which is a mountain named Ton-con 1,200 feet high, which may be seen 40 or 45 miles off; and from there being no other high land in its vicinity, may be taken for an island. Ton-con point is bluff and steep-to; good shelter may be found under this point during the north-east monsoon.

Between False Tinhosa and Ton-con mountain, the land contiguous to the sea is mostly low and level, covered with trees; but far inland the country is mountainous. At Kachie, 23 miles north of False point, there is a pagoda which forms a good land mark. The low part of the coast should not be approached under 15 fathoms water in passing along, for it is said that the bottom is foul and rocky under this depth.

A cluster of rocks, above water, was seen from the *Egeria*, extending about half a mile from the extreme of the land under mount Ton-con. There are 18 to 20 fathoms water about  $2\frac{1}{2}$  miles from Ton-con point, on a foul bottom, and 38 and 40 fathoms 12 or 15 miles off.

**Chun-lan**, situated about 15 miles south-west from Ton-con point, is one of the safest harbours on the coast for vessels that can cross the bar; the shore in this vicinity is composed of a low sand beach with cocoa-nut trees extending almost to the water's edge; a ridge of rocks, dry at low water, extends from the north entrance point nearly half-way across the mouth of the river; the bar appears to break across the entrance. The best anchorage is  $1\frac{1}{2}$  miles within the bar: the town of Wan-chum is 12 miles from the anchorage.

Wood, water, and provisions can be obtained.

**Anchorage.**—The *Egeria* anchored off Chun-lan river in 7 fathoms, hard sand, with mount Ton-con bearing N.E.  $\frac{1}{2}$  E., and a fort, with a pagoda in the centre, on the north entrance point of the river N.W. by N.

**The COAST** from Ton-con point trends in a N.N.W. direction 25 miles to Mo-fou point; northward of Ton-con point the shore is very low and sandy, without cultivation; to the northward of this low land the coast becomes again high, and safe to approach: the high land projects a little to the eastward, and from lat.  $19^{\circ} 43' N.$  stretches northward, forming Mo-fou point, the north-east extremity of Hainan island, in lat.  $20^{\circ} 2' N.$ , long.  $110^{\circ} 59' E.$  (approximate).

**Mo-fou point**, low and sandy, has some detached rocks close to, with shallow water extending about a mile to the eastward. H.M.S. *Lily*, 1877, rounded Mo-fou point at a distance of about 2 miles, in 10 and 12 fathoms water.

**Mount Mo-fou**, a remarkable double mount, about 1,000 feet high, lies 4 miles S.W. from Mo-fou point, and makes from seaward like an island.

**The TAYA ISLANDS**, separated from Hainan island by a channel about 12 miles wide, consist of two groups of high barren islands, six or seven in number, with some rocks, which may be seen about 12 or 15 miles off. The pilots say there is a safe passage 3 miles wide between the two groups. They extend in a N.E. by N. and S.W. by S. direction the northernmost island in about lat.  $19^{\circ} 58' N.$ , long.  $111^{\circ} 16' E.$ \* (Captain Valois of the German corvette *Nautilus*, 1877, makes the longitude

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\* Captain R. H. Napier, H.M. surveying vessel *Magpie*, 1879.

111° 15' 30" E.) is 360 feet high, and steep-to; at  $2\frac{1}{2}$  cables from the south side of the island there is 27 fathoms, mud, and temporary anchorage might be taken up, but a swell rolls round the island; the southernmost island, seems one of the largest, and from it a high sand-bank stretches to the N.N.E., having regular soundings, 20 and 21 fathoms about 3 miles from it on the east side. When these islands bear W. by S. distant 21 miles, the depth is 45 fathoms; when they bear N. by W. about the same distance, it is 48 fathoms; and soundings extend on the parallel of the northernmost island, as far eastward as the meridian of the Grand Ladrone. The *Warley* had 36 fathoms in lat. 20° 25' N., with the Taya islands bearing South, having been driven to the westward in a typhoon, September 24th, 1803.

The depths in the channel between the Taya islands and Hainan are from 10 to 17 fathoms; and there is in the western part of the channel, adjacent to Hainan, a high-peaked island, named Feou-keou.

Captain Ross remarks:—We found from 21 to 29 fathoms water to the westward of the Taya islands, 35 fathoms about 4 or 5 miles to the southward, and the same depth about a mile to the northward of them.

#### SOUTH AND WEST COASTS.

**YU-LIN-KAN BAY**, situated on the west side of cape Bastion (page 386), is separated from Sama bay by a long narrow strip of land, which terminates in Salomon point, between which and Paumel or Tomb point is the entrance,  $4\frac{3}{4}$  miles wide. About  $1\frac{3}{4}$  miles northward of Paumel point, and near the eastern shore of the bay, is a small island named Belier. The usual anchorage is in 9 or 10 fathoms on a mud and sand bottom, about three-quarters of a mile north-westward of Zonby island, sheltered in every direction, except between South and W.S.W. Several vessels, driven from the coast of China by typhoons at the beginning of the north-east monsoon, have been known to take shelter here until the monsoon was over. The bay cannot be a safe anchorage in the south-west monsoon, for it is exposed to the wind and swell from that quarter; a small vessel may, however, proceed sufficiently far into the inner harbour to ride with perfect security, and to repair any damage. There appeared to be no hidden dangers in the bay, excepting the small reefs that extend a short distance off the shores. The depth of water across the entrance varies from 15 to 12 fathoms, soft bottom, and decreases gradually to the shore.\*

**Water.—Bullocks.**—Horsburgh states that there is fresh water to the northward of Belier island on the eastern shore of the bay. Captain Ross did not perceive any stream of fresh water in the vicinity

\* See Admiralty plan of Yu-lin-kan bay, No. 1,019; scale,  $m = 1\cdot6$  inches.



of the anchorage, but observed some wells in a village, at the back of the eastern point of the passage into the inner harbour, and where bullocks may be obtained.

**Inner Harbour.**—To the north-westward of the anchorage in the bay is a good channel leading into a creek or inner harbour, which is said to be the resort of pirates. Rocky or Foul point, forming the east side of entrance, is fronted by a rocky reef which extends more than a cable into the channel, and 2 cables to the north-west of the point; but Sandy point, on the west side, has 4 fathoms within a short distance of it. Between these points the distance is not above a quarter of a mile, but the channel is contracted to half a cable by the reef projecting from Rocky point. To the southward of Sandy point, about half a mile, a reef projects about a cable from the western shore, requiring care when steering for the entrance.

The inner harbour is surrounded by hills, and forms the outlet of a fine river which falls into its north-east part. There are  $3\frac{1}{4}$  to  $4\frac{3}{4}$  fathoms, soft mud, in the middle of the western part, but nearly its whole extent is obstructed by banks of mud and rocks; there is a coral patch at the north side of entrance.

**Directions.**—A vessel may warp into the inner harbour if the weather be fine; or with a southerly or easterly wind she may sail in, by keeping nearest to the eastern shore until nearly abreast Rocky point, then steer over for Sandy point, and round it at a short distance. A peak on the northern shore of the inner harbour bearing N.W. by N. will lead through the entrance in  $4\frac{3}{4}$  fathoms water. The best time to enter is at low water, the dangers being then more conspicuous, and 5 or  $5\frac{1}{2}$  fathoms will be the smallest depth in the fair channel. Having rounded Sandy point, and shut it in with the land on the east side the outer bay, anchor in  $5\frac{1}{2}$  or 6 fathoms, within a little less than half a mile of the shore near Sandy point, but before mooring it will be requisite to examine the bottom in a boat.

**Tides.**—It is high water, full and change, in Yu-lin-kan bay at 9 h. 5 m.; springs rise  $2\frac{1}{4}$  feet. There is only one tide in 24 hours during springs, but two tides during neaps.

**Sama or Samoy Bay (Sanghai),** situated on the west side of Salomon point, has several rocks and islets in it, with anchorage inside them for small vessels. There appears to be a good passage, with 16 fathoms water, between East island and Salomon point. A considerable river, with a small fort at its entrance, falls into the north-east part of the bay, and Sanghia or Sama town, the residence of a mandarin, stands near its western bank.

**The Coast** from Salomon point trends about W. by N. 21 miles to Great cape, E.N.E. of which, at a distance of 4 or 5 miles, there is a hill having on it a pagoda. A dangerous sunken rock, on which the sea breaks if there be a swell, lies S.W. by W.  $\frac{1}{4}$  W. from  $3\frac{1}{2}$  miles from Great cape.

**YAIT-CHU BAY** is the westernmost bay on the south side of Hainan. It has some islets in it, and moderate depths for anchorage, but is exposed to southerly and south-westerly winds. A little way up the river (only navigable for boats in the rainy season) which falls into the bay stands the fortified town of Yait-chu, with a citadel or fort to the westward. The governor of the island frequently resides here, it being one of the chief towns.

**Snake Point**, the west point of Yait-chu bay, lies 11 miles W.N.W. from Great cape, having on its eastern extreme two hummocks 100 feet high; off this point are two islands named Mud and Button. A short distance westward of Button is the Maddock rock, which covers at half tide. The channels north of these islands are not safe.

**Yait-chu or Ny-chau**, the principal port of the south, is situated in Yait-chu bay immediately to the westward of Great cape; the bar has only 7 feet water on it; within is a good but small and shallow harbour.

Yait-chu bay affords good anchorage during the north-east monsoon in  $3\frac{1}{2}$  fathoms, about 2 miles from the beach at the head, from which to the shore the water shoals very gradually.

A good position for anchoring, is with Yait-chu fort bearing N.N.E. and Mud island in line with Button island, bearing W.  $\frac{1}{4}$  S.

**The Coast** from Yait-chu bay trends in a north-westerly direction 45 miles to Pyramid point; there are several sand banks off this part of the coast, the most dangerous of which lies about 15 miles south of Pyramid, and 10 miles from the shore. The sea breaks on these banks, and the colour of the water with the soundings, are the only guide for a vessel navigating among them; vessels of light draft can navigate inside these banks. The land between Yait-chu and Pyramid point is a flat sandy plain, with high land in the background. Pyramid point, 50 feet high, has a pyramidal rock, standing on a low, flat, sandy point.

**Back-li Bay**, so named from a village about two miles inland from its head, lies north of Pyramid point. A low sandy beach extends from the spit off See-ku-sha point, the north entrance point of the bay, to a reef abreast the village, where it terminates in a domed-shaped hillock visible some distance seaward, and making like an island. This reef covers at high water, and extends about 200 yards from the shore. The anchorage

is off the port of Back-li, known as Tung-tau, which is a small creek in the sand, with a depth of from 5 to 6 feet at high water. Between Tung-tau and See-ku-sha point there are sand banks on which the sea breaks: there is a depth of  $2\frac{1}{4}$  fathoms at low water, at a distance of about 2 miles from the shore, and at half a mile from these banks.

**From Back-li Bay, to Bluff Point** 300 feet high and rocky, 8 miles to the northward, the course lies among shoals, but from Bluff point to Hoi-ta, nearly 20 miles north-east of it, a depth of 7 fathoms will be found within 2 miles from the shore. To the southward of Bluff point is the walled city of Chunyan, but there is no safe anchorage near.

**Hoi-Ta** is formed by a small river; the mouth is a kind of lagoon, dry at low water, with the exception of a small portion which forms the harbour; this harbour is so small that only one gun-boat, moored head and stern, can lie in it; the least water on the bar is  $2\frac{1}{2}$  fathoms, the deepest water being on the village side.

Hoi-ta is the largest fishing station on the coast, and is the nearest port to the copper mines formerly worked by the Chinese. Water can be procured at Hoi-ta, and an abundant supply of wood.

Just to the northward of Hoi-ta is a reef covered at low water, about 3 miles long, and three-quarters of a mile from the shore: approaching it the soundings decrease rapidly from 7 to 3 fathoms, and then to 8 feet, in a distance of 200 yards. Between Hoi-ta and Chappoo bay, 7 miles to the eastward, good water can be obtained, but the shore is foul for the distance of one mile from the beach. Two small conical hills standing in the plain by themselves, and in front of the range behind them, form good land marks for Hoi-ta to vessels coming from the south-west: from the north-east these hills appear as one, but are still remarkable.

**Chappoo Bay** is large and open, with a reef in the centre. On the north-east side is the small harbour of Heong-po, formed by reefs, and perfectly sheltered from all winds. It is the best harbour on the coast for vessels of a moderate draught, there being not less than 4 fathoms water in it; a small sand-bank, which dries at low water, lies on the starboard hand going in, but it is steep-to. Within the harbour is a large lagoon with a small river running into it; the lagoon is full of sand-banks, and it has two forts at the entrance. Heong-po is a small fishing village, but six miles from the upper end of the lagoon is the district city of Tam-chau.

**Pillar Point**, the north entrance point of Chappoo bay, has a peculiar pillar rock on it, and a small islet connected with it at low water. The reef off this point can be passed close to; it appears to extend from the coast about 4 miles in a south-west direction.

**Hau-sui Bay.**—Pingmar, or Double Hill point, which forms the western point of Hau-sui bay, lies about 14 miles north-east of Pillar point. About a mile east of it there is a remarkable double-coned hill,

which has the same double appearance when approaching from north or south, but makes like a round-topped single mount when bearing about S.S.E., 25 or 30 miles distant.

Near the centre of the bay there is an island of sand (Stumba) surrounded by a reef.

Good anchorage in 5 fathoms may be obtained within the reef that extends from Stumba island, and which affords excellent shelter; the pass northward of the island is narrow, but to the southward open. The village of How-sui is on the east side of the bay; the anchorage off it is not so good as the one already described.

**Heong-Pi** is a small harbour formed by reefs, 23 miles north-east from How-sui, and about 4 miles south of the north-west extreme of Hainan island. It is much frequented by piratical junks.

### HAINAN STRAIT.

Hainan strait, situated between the north coast of Hainan island and the south coast of Lien-chew peninsula, is about 40 miles long, east and west, 9 miles wide at its western, and 19 miles at its eastern entrance, from which numerous sand banks extend in a north-easterly direction for a distance of about 25 miles. Although this strait and its approaches have not been thoroughly surveyed, it may, with care and attention to the following description be navigated without difficulty.

#### SOUTH SHORE.

**The Coast** in the vicinity of the north-west extreme of Hainan island consists of a steep sandy beach, fringed along the top with scrub; the land at the back is low and level for some miles, whence a long hill, named Laam-koo, in latitude  $19^{\circ} 55' N.$ , longitude  $109^{\circ} 35' E.$  (approximate), slopes gradually, from a small mound in its centre, towards the east and west. High mountains, apparently of volcanic origin, are visible some miles inland at the back of this hill.

Between Laam-koo and Pingmar hills the land appears low over How-sui bay; about half way between the two hills, and some distance inland, is a round-topped, isolated, conspicuous hill, named Koong-chin, and volcanic mountains are sometimes visible beyond.

**MANU HARBOUR**, situated about 10 miles within the south-west entrance point of Hainan strait, has a reef half a mile off its western entrance point. Sad point, the eastern entrance point of this harbour, is a small peninsula composed of dark red cliffs, about 80 feet high, connected with the main by a low neck of land a quarter of a mile long. A detached rock about 80 feet high lies a short distance from the north-east extreme of Sad point.

The land around and at the back of Manu harbour is low and apparently well cultivated.

**The Coast** from Sad point curves to the south-eastward, and forms a bay 12 miles wide and 4 or 5 miles deep between it and Jin-mee point.

About 6 or 7 miles inland a range of hills rises gradually from the eastward and terminates to the westward, in two extinct craters, named the Hummocks. They are visible about 25 miles distant, and form a conspicuous mark.

A remarkable cone-shaped mound on Jin-mee point, situated about half a mile from the beach, forms a conspicuous object, and is in line with the Hummocks when bearing S. 13° E. Numerous fishing stakes extend from this point for a distance of about a mile.

A village built of black bricks or lava is situated about a mile along the beach, on the west side of the point, forming a conspicuous dark patch among the sand hills; fishing stakes extend in a westerly direction from it.

The land is low around this bay, rising gradually towards the Hummocks, and about half way round the bay is a small hill with a mound on it. The country appears to be fertile and well cultivated; the beach is fringed with trees and bushes. Towards the west part of the bay the land rises.

**HOI-HOW BAY**, situated between Jin-mee point and Backsha point, 9 miles east of it, is  $4\frac{1}{2}$  miles deep.

The land in the neighbourhood of Hoi-how is low, and appears well wooded; midway between Jin-mee point and Hoi-how there are some red cliffs, with barren sand hills on the west, and clumps of bushes with signs of cultivation on the east side.

**Hoi-how Shoal** with 12 feet water, and 5 to 7 fathoms close around, lies about 2 miles from the west point of the bay, with Jin-mee point bearing W. by S.  $\frac{1}{4}$  S. and Hummocks S.  $\frac{1}{2}$  W.

**Hoi-how River.**—The entrance of Hoi-how river is marked by three whitewashed forts, which bear E.S.E., about  $2\frac{1}{2}$  miles from the south extremity of Backsha sand spit. Hoi-how, the principal sea-port town of Hainan and a treaty port, is situated on the bank of the river, about half a mile inside the forts. At low water the shallow flat-bottomed native boats cannot enter, but large junks are taken up for repairs at high tides. The river is not navigable beyond the town.

Landing or embarking cargo is greatly impeded by the long mud-flats stretching off the town. The facilities for transshipment are not good, owing to the small size of the cargo-boats. The British consulate stands about a quarter of a mile south-east of the southern fort at the mouth of the Hoi-how river, and at high water is isolated from the surrounding neighbourhood.

The building allotted to the staff of the Maritime Customs, which is only accessible to cargo-boats at high water, lies east of the British consulate, and not far from the edge of the western suburb.

**Population.**—The population of Hoi-how in 1876 numbered about 12,000.

**Kien Chu**, the capital of Hainan, is about  $2\frac{1}{2}$  miles from Hoi-how between which there is a good road.

**Anchorage.**—The anchorage in Hoi-how bay is partially protected by Backsha sand spits, on its north-east side, and by the mainland to the eastward and south-westward; it is open from N.E. round by North to West, and scarcely sheltered between West and S.W.

Chinese gunboats have ridden out typhoons in the bay, which is described as a dangerous anchorage, owing to the heavy confused sea that gets up; the holding ground is said to be good, a mixture of mud and sand. Coming from the eastward, after rounding the fishing stakes, a course S.S.W.  $\frac{3}{4}$  W. for the hummocks will lead to the anchorage in not less than 3 fathoms water, with the west extremity of a remarkable hedge on the top of the flat land, under the centre of the large hummock bearing S.S.W.  $\frac{3}{4}$  W., and the southernmost of the three whitewashed forts at Hoi-how, in line with the south end of the Backsha spit, S.E. by E.  $\frac{1}{4}$  E., a clump of five palms S.E.  $\frac{1}{2}$  E. About a quarter of a mile south-westward 15 feet will be found. The small Chinese gunboats and junks anchor in 8 to 10 feet S.W. by W. from the end of the sand spit with the forts bearing East (nearly).

From the depth of 3 fathoms the water shoals gradually towards the beach around the bay towards Jin-mee point, and a sand bank with 8 feet on it, steep-to on both sides, is reported to face the beach east of that point for a mile.

Vessels from the westward keep about 3 miles off Jin-mee point, and steer for Backsha point, until Kien-chu pagoda bears S.E. by E.  $\frac{1}{4}$  E., when they should alter course to bring the end of the sand spit and the forts in line.

**Supplies** are plentiful and prices moderate. Water is brought off in water boats, but it is unfit for drinking or cooking purposes, being muddy and brackish.

A large trade in sugar, ground nut cake, bean cake, also oil, coins, and Chinese articles is carried on by junks, between Hoi-how, Swatow, Macao, and other northern ports.

**Winds.**—Typhoons are said to be very severe on Hainan island. They occur from June to October, the worst being in August and September. Hoi-how is frequently visited by hard squalls, lasting only a few minutes, but with such force as to be very destructive to small vessels.

**Temperature.**—During June, at Hoi-how, the temperature on deck in the shade was  $95^{\circ}$  between noon and 3 p.m., and  $83^{\circ}$  at night.

**Tides.**—At Hoi-how, during 37 days in May and June 1876 when the tides were observed by H.M.S. *Egeria*, the greatest range was found to be

11½ feet, the least 2 feet; at the period of the highest tides, which apparently follow the moon's extreme declination, there is only one flood and one ebb in the 24 hours, the flood making for about 16 hours, the ebb for about 8 hours, velocity 1½ or two knots an hour. In like manner the tidal stream through Hainan strait was observed to set to the westward for 16 hours, to the eastward for about 8 hours; greatest strength 2 to 3 knots an hour. On the Hainan shore the stream is said to turn an hour earlier than in the offing.

**Hoi-how, or Backsha Point**, is low and sandy, with occasional hillocks and patches of green scrub. The village of Backsha, a cluster of houses built of lava and black bricks, is situated about a couple of miles back from the beach. Numerous fishing stakes extend in a N.N.W. direction about 2 miles from Backsha point, into 8 and 9 fathoms water; there are said to be 4 fathoms between them and the beach. Chinese gunboats of 8 feet draught occasionally use that channel; an English steam vessel, however, grounded on a sand bank, in 9 feet, with the end of the fishing stakes bearing W. by S. Hainan head E. by N., and Poochin pagoda E. ½ S., so that, until better known, vessels should not venture too close to this shore.

Narrow sand spits, which almost cover at high water, and with one or two openings between them, leading by shallow channels to Backsha, extend for about 2 miles to the south-west from Hoi-how point, the mainland lies about 2 mile to the eastward of these; the space between consists of mud flats covered at high water.

**Kien-Chu pagoda** bears about S. ¾ E. from Hoi-how point, and forms a good land mark, but is obscured by trees when bearing westward of South.

There appeared to be a junk harbour with Kien-chu pagoda bearing South, a long line of masts being visible inside the beach when it was on that bearing.

**The COAST** from Hoi-how point to the entrance of Poochin lagoon a distance of 15 miles in an E. by S. direction, is low, with no conspicuous objects for the last few miles; it forms a deep bay, which is reported by the native fishermen to have several shoal patches. From the entrance of the lagoon to Poochin point, a distance of 4 miles in a northerly direction, is faced with rocky patches, and must be approached with caution. There is said to be a well sheltered and safe anchorage in the north-east monsoon, in 4 fathoms, about half a mile South-west from Poochin point.

Along the shore at the distance of half a mile, there are depths of 5 to 7 fathoms water, which decreases to 4 fathoms as the anchorage is approached; numerous fishing stakes are met with, and there are some shoal patches, necessitating a good look-out and attention to the lead.

**Poochin Lagoon** entrance may be recognised by a well defined gap in the low land, which gradually increases in height towards Poochin point, this lagoon is said to form a good harbour, having from 15 to

25 feet water within ; but a shallow bar with from 7 to 8 feet on it renders it unavailable for any but vessels of light draught. The large trading junks from Singapore and North China lie here waiting change of monsoon or during typhoon weather. The village of Poochin is small and unimportant.

**Poochin Pagoda** is a round whitewashed building with a red top, 488 feet above the sea ; it stands on the summit of the highest of three remarkable hills, about three-quarters of a mile from the point. A patch of rock well above water at half tide, lies about half a mile West of Poochin point.

A shoal, on which the water is said to break, is reported to lie N.W. by W. from Poochin pagoda, about 3 miles off shore. This shoal is said to extend 8 miles in an east and west direction.

**HAINAN HEAD**, about 180 feet high, situated about 6 miles north-east of Poochin point, is composed of sand, and when seen bearing S.W. by S. 5 or 6 miles distant, appears to terminate in a flat-topped mound, about three-quarters of a mile S.W.  $\frac{3}{4}$  W. from the north-east part of Hainan head. From the mound, the land slopes gradually to the south-east, merging into the low sand hills of which the coast line between Hainan head and Mo-fou point consists. It is covered with short scrub, almost to the water, which continues also for about a mile to the south-east, where all vegetation ceases, except a few isolated green patches.

The north-east part of Hainan head is low and rocky, terminating in a reef awash at high water, extending North half a mile from the shore.

The coast from this trends nearly S. by E.  $\frac{3}{4}$  E., about 6 miles, thence gradually curving to the eastward for 11 miles, forms a deep bay terminating in Mo-fou point (page 389) ; from about one mile south of the north-east part of the head a rocky reef skirts the shore round to Mo-fou point.

A pinnacle rock on which H.M. surveying vessel *Magpie*, 1879, struck, lies about  $2\frac{1}{2}$  miles S.E. from Hainan head, and  $1\frac{1}{2}$  miles from the shore.

About 3 miles S.E. from the north-east part of the head, and  $1\frac{1}{2}$  miles from the shore there is a depth of 4 fathoms with 10 and 11 fathoms a short distance north-eastward.

**Sa-Chau**, is a small village 9 miles south-east from Hainan head, conspicuous from the cultivation about it.

**DANGERS off Hainan Head.**—In the vicinity of Hainan head there are several dangerous sand banks, upon which the sea sometimes breaks. There are deep water channels between them which when thoroughly surveyed and defined may be used by vessels proceeding to the eastward, but an attempt to pass westward between the banks must always be attended by uncertainty and risk, owing to the strong currents which prevail in this neighbourhood, and the distance of the sand banks from the land. No reliable directions for the passage in or out can be laid down until this locality is better known.



Navigating Lieutenant W. H. Stephens, H.M.S. *Egeria*, 1876, remarks :—The sea does not always break upon these banks, and sometimes breaks on one or more and not on all ; a vessel cannot, therefore, depend on sighting them. The soundings are very irregular, the formation of the bottom being apparently long, narrow, ridges of sand ; depths of 14, 12, 9, 7, 5, and 4 fathoms, deepening in a similar manner, will be found frequently within the space of a mile.

The most northern line of breakers seen by the *Egeria* is situated 18 or 19 miles N.E. from Haïnan head. There appeared to be a line of discoloured water lying East and West, about 3 or 4 cables long, with breakers at each end.

The *Egeria* passed about 3 miles South of them, crossing a strong tide rip, the water shoaling rapidly from 12 fathoms to  $5\frac{1}{2}$ , and deepening again as quickly to 7, 9, and 12 fathoms.

Soundings in 10 fathoms and above were obtained with mount Mofou bearing South, and Haïnan head S.  $54^{\circ}$  W. ; in 7 fathoms, with mount Mofou bearing S.  $3^{\circ}$  E., and Haïnan head S.  $52^{\circ}$  W. ; in 5 fathoms, with mount Mofou bearing S.  $4^{\circ}$  E., and Haïnan head S.  $50^{\circ}$  W. ; in 14 and 15 fathoms, with mount Mofou bearing S.  $8^{\circ} 15'$  E., Haïnan head and Poochin pagoda almost in line, S.  $49^{\circ}$  W.

About 5 miles S.S.E. from this patch of breakers is apparently situated the line observed by the *Egeria* when attempting to enter Haïnan strait from the eastward. Her position by observation at noon was latitude  $20^{\circ} 17'$  N., longitude  $111^{\circ} 2'$  E. Haïnan head bore W. by S.  $\frac{1}{2}$  S., mount Mofou S.  $\frac{1}{2}$  W., and the soundings were 7,  $5\frac{1}{2}$ , 5, and 4 fathoms. A line of breakers was visible extending from North to N.N.W., about 3 or 4 miles distant, which places them in latitude  $20^{\circ} 20'$  N., longitude  $110^{\circ} 0'$  E.

The *Egeria* steered to pass round the east end of these breakers, but had repeatedly to alter course to S.E. and East, the water shoaling from 10 fathoms suddenly to 7 and 5 on N.E. and northerly courses. At 3.45 p.m., being in 13 fathoms (latitude  $20^{\circ} 22'$  N., longitude  $110^{\circ} 57'$  E. approximately), West, and S.W. courses were steered in from 9 to 13 fathoms, and anchored in longitude  $110^{\circ} 52'$  E. in  $11\frac{1}{2}$  fathoms.

About 5 or 6 miles S.S.E. from the above-mentioned breakers, Captain Hunter of the British steam vessel *Washi* observed a line of breakers, about 3 miles long, extending W.S.W. from latitude  $20^{\circ} 15'$  N., longitude  $111^{\circ} 4'$  E. At a distance of 3 or 4 miles to the S.S.E. there was broken water with the appearance of another bank. When steering West, about 2 or 3 miles South of this line of breakers, the soundings varied from 10 to 5 fathoms, deepening again to 10 and 13 fathoms towards Haïnan head.

Captain Hunter, who has now passed backwards and forwards several times between each of these line of breakers, considers, from the character

of the soundings between them, that they are all connected by ridges; the least water he has found being 4 fathoms.

Another line of breakers about 9 miles North of Hainan head, appeared to extend about half a mile in an East and West direction. A patch of breakers was also observed about 2 or 3 miles East from the extreme of Hainan head. A bank, upon which 4 fathoms has been found, appears to be situated about 4 miles N.W. from Hainan head, and may possibly be joined to the head.

#### NORTH SHORE.

**HAI-AN BAY.**—The coast from cape Cami (page 381) trends in an easterly direction 16 miles to Hai-an bay, which lies N. by W.  $\frac{1}{2}$  W.  $10\frac{1}{2}$  miles from the anchorage in Hoi-how bay. It may be easily recognised by a white fort, (96 feet above high water,) erected on the west entrance point opposite the village of Hai-an. Sheu-men pagoda, another conspicuous land mark, lies N. W. from Hai-an fort distance about  $5\frac{1}{2}$  miles.

The anchorage is protected from all winds from East round through North to West; the bottom is mud, and affords good holding ground.

The greater part of the sugar exported from Hoi-how is brought over in junks from Hai-an.

**Directions.**—Steer for Hai-an fort bearing North, and anchor in 5 fathoms water about  $1\frac{1}{4}$  miles from the fort. From this position the water shoals rapidly to the shore.

There is 2 feet, at low water springs, in the boat channel of the creek off the village of Hai-an.

**Baksha Village** is situated at the head of a white sandy bay, about 2 miles east of Hai-an: there is anchorage for junks about a quarter of a mile from the village. Numerous fishing stakes extend off the east point of Hai-an bay, and a reef of rocks stretches off the same point, in a south-easterly direction, for some distance.

**The Coast** from Hai-an bay trends in a north-easterly direction 10 miles to Hongham a small fishing village, thence 5 miles to the north-east entrance point of Hainan strait.

#### DIRECTIONS.\*

**Entering from the Westward.**—The west entrance to Hainan strait, which lies between cape Cami and the north-west extreme of Hainan island (page 394), should be approached with caution as the soundings are irregular and shoals extend some distance from the land; discoloured water will however be seen occasionally in depths of 10 to 15 fathoms.

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\* As the dangers in the vicinity of Hainan strait are little known, these directions must be used with caution; and the use of the lead accompanied by a good look-out from aloft, is strictly enjoined.

The *Egeria* anchored for a night in  $8\frac{1}{2}$  fathoms, sand and mud, with Pingmar hill bearing S. by W., and Laam-koo hill S.E.  $\frac{1}{2}$  E., and when steering for Hoi-how, keeping about 7 miles off the coast of Hainan, the soundings deepened to 20 and 25 fathoms, bottom of coarse sand, which was the general depth the whole distance to Jin-mee point.

Mr. Anderson, master, S.S. *Conquest*, 1876, reports the existence of a good channel, free from danger, through the numerous sandbanks lying off the eastern entrance to Hainan strait.

He recommends, when leaving Hoi-how, to bring the sand-spit off Baksha point to bear South, thence an E. by N.  $\frac{1}{2}$  N. course, will lead between the shoals in not less than 12 fathoms water.

Captain De Longueville, of the Imperial Chinese gunboat *Tsing-Po*, states that a safe channel (South channel) exists close round the rocks off Hainan head, and parallel to the shore between the beach, and the breakers lying East of the head, when abreast of the village of Sa-chau, a vessel is south of all the dangers and may steer out East.

The Chinese pilots between Hong Kong and Hoi-how use this channel.

The tides are said to run at the rate of 5 or 6 knots round Hainan head; and heavy overfalls are said to exist in this vicinity. This passage would, therefore, be dangerous for sailing vessels.

Patches of discoloured water, with the sea breaking as over a shoal, are frequently met with in Hainan strait. They are no indication of shoal water however, the *Egeria* having passed over and through many of them, with soundings of 20 to 25 fathoms.

**Entering from the Eastward.**—Captain T. E. Cocker of the Chinese Revenue cruiser *Ling Fing*, 1876, offers the following suggestions for approaching Hoi-how bay, they should however be used with caution, until the locality is better known :—

Vessels from the eastward should endeavour to make Hainan head, bearing S.W. by W.  $\frac{1}{2}$  W. and keeping it on that bearing, approach within 6 miles; then steering to the north-westward pass 4 miles north of Hainan head. Bring Poo-chin pagoda to bear S.  $40^{\circ}$  W., well open of Hainan head, and pass 3 miles north of pagoda, then haul out to pass 8 miles north of the low sandy coast which lies between Poo-chin pagoda and Hoi-how, until the hummocks bears S.S.W., when the vessel may steer to pass outside the fishing stakes and thence for Hoi-how bay.

After passing Poo-chin, Kien-chu pagoda and the hummocks will be distinctly seen.

The shoals at the eastern entrance of the strait may be identified by the dark yellow water on them, and by the heavy breakers which exist. The channels between are 4 or 5 miles wide, the water is of a light green tint, with probably depths of 5 to 12 fathoms.

Captain Hunter trading to Hoi-how endeavours to sight Hainan head bearing W.S.W., and steers in on that bearing passing about 4 miles northward of the head, and then steering W. by S. for the end of the fishing stakes off Backsha point. The *Washi* has made the passage several times, but has had to feel her way between the shoals, more than once having got into shoal water suddenly, and being obliged to anchor on one occasion. A similar circumstance occurred to H.M.S. *Egeria* when endeavouring to enter Hainan strait from the eastward; the water shoaled from no bottom at 13 fathoms to 4 fathoms, with a line of breakers 2 or 3 miles distant.

**South Channel.**—Commander B. E. Cochrane, H.M.S. *Lily*, 1877, remarks:—When within 7 or 8 miles northward of Taya islands, steer West (passing about 4 miles northward of Mo-fou point) until mount Mo-fou bears S.S.E.  $\frac{1}{2}$  E., thence about N.W. by W. for the north-east extreme of Hainan head, from which the northern edge of the breakers bears E. by N. distant about one mile. Should the water shoal to less than 10 fathoms when within 4 miles of the head, and  $2\frac{1}{2}$  miles from the shore, keep a little nearer the breakers. When at a distance of one or  $1\frac{1}{2}$  miles from the head keep nearly midway between the shore and the breakers, closing the land a little on nearing the head, and round the reef extending northward therefrom (page 398) at a convenient distance; (*Lily* rounded at a quarter of a mile, with no bottom at 15 fathoms;) the only known detached danger for several miles to the northward being a shoal of 4 fathoms, at  $3\frac{1}{2}$  miles N.N.W.  $\frac{1}{2}$  W. from the north-east extreme of Hainan head.

After rounding Hainan head a W.  $\frac{1}{2}$  S. course will lead clear of the shoals between Poochin and Backsha points; should the tide however be running strong to the westward, a more northerly course may be necessary, as this stream frequently sets nearly S.W.; do not shoal to less than 10 fathoms between these points, and when abreast the fishing stakes extending from Backsha point (page 397) steer about S.S.W.  $\frac{3}{4}$  W. for the hummocks, which will lead to the anchorage in Hoi-how bay (page 396).

**Caution.**—Owing to the strong tides, and to the narrowness of South channel, it is not advisable to attempt it the first time without a pilot.

Captain Valois, of the German corvette *Nautilus*, 1877, having made two voyages from Hong Kong, through Hainan strait, advocates the use of the South channel. He recommends making mount Mo-fou from seaward on a W.  $\frac{1}{4}$  S. bearing, and passing about 3 to 5 miles northward of North Taya island, thence westward for Sa-chau, along the coast and around Hainan head. The least water obtained by the *Nautilus* in the narrow part of South channel, near Hainan head, was  $4\frac{1}{4}$  fathoms at low water.\*

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\* See voyage of German corvette *Nautilus*, in *Annalen der Hydrographic*, Heft x., 1877.

## CHAPTER XVIII.

## SOUTH COAST OF CHINA.—HAINAN STRAIT TO CANTON RIVER.\*

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VARIATION, 1° East in 1879.

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**HAINAN STRAIT to NAU-CHAU.**—Lieutenant C. E. Domville, H.M.S. *Algerine*, 1868, remarks :—That no safe directions can be given for going through the channels between the sands, as no land can be seen, the pilots are guided by their local knowledge and the soundings. the least water passed over in the *Algerine*, was  $2\frac{1}{2}$  fathoms. There are several anchorages inside the sands.

**NAU-CHAU**, in about lat.  $20^{\circ} 58' N.$ , long.  $110^{\circ} 37' E.$ , bearing S.W. about 45 miles from Tien-pak, and lying off the north-eastern part of the peninsula of Lien-chew, is a small port dangerous to enter, but when in it there is good shelter. This place was a rendezvous of the Ladrões, whose vessels anchored in great numbers alongside the forts and town, their crews being part of the inhabitants. *The Maria*, a Portuguese ship, went into this place for water, and was captured by the Ladrões; vessels therefore ought not to go into the harbour if not well armed.

Nau-chau island is about 300 feet high, 8 miles long north and south, 7 miles broad, and well cultivated. Strangers should be careful to avoid the sand-banks and rocks which extend nearly a mile from the northern shore. Off the north point is a dangerous horn of sand, and it would be advisable to obtain a pilot from a fishing boat, or anchor and send to the town for one, before proceeding farther. Low water would be the best time to enter, as the shoals are then visible.

In addition to middle bank in the centre of the channel between Nau-Chau and the island forming the south side of Kwan-Chau Wan, there is a bank with only 6 feet water, extending from the island. The least water found (4 fathoms) was off the north end of the island, 7 fathoms were carried through the channel, it then deepened to 10 towards the fort. The

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\* Chiefly from the surveys of Captains Ross and Maughan, I.N. See Admiralty charts :—China sea, Northern portion, No. 2,661a : Hainan island to Macao, No. 1,246; scale,  $m = 0.23$  of an inch : and China, East Coast, Sheet 1, Mong-chow to Hong Kong, No. 2,212; scale,  $m = 0.23$  of an inch.

*Algerine's* pilot did not know of the existence of a channel north-west of the middle bank.

The best anchorage is off the village on the south-west side of the island, but not too close to the fort, as the water is deep ; this anchorage is exposed to the southerly winds, but with those winds a vessel could anchor in the channel.

Wood and water can be obtained at Nau-Chau. The fishermen are the best pilots for Nau-Chau, but there is a staff of pilots maintained to take vessels to Haïnan.

The passage out to the southward has three dangers,—the bar, the flats, and the narrows. At 14 miles S. by W. from the west point is an extensive flat from 2 to 3 miles broad, with only 9 or 10 feet on it at low water, and frequently impassable from the heavy sea on it when the wind is strong, it being exposed to the whole drift of the north-east monsoon ; here *H.M.S. Fury*, drawing  $14\frac{1}{2}$  feet, touched in 3 fathoms.

The narrows, at 17 miles S. by W.  $\frac{1}{2}$  W. from the same point, has not less than  $3\frac{1}{2}$  fathoms water. The channel here although very narrow is not dangerous, as the water is always smooth, being in the immediate vicinity of the sand-banks with which the coast in this part is bounded.\*

Between the narrows and the bar, the *Columbine* and *Fury* remained at anchor two nights, after unsuccessful attempts to cross the flats.

The coast from Hongham to Nau-chau is generally sand hills, but the country is well wooded 3 or 4 miles inland ; W. by S. from the above flats is a small bay and town, the only one visible.

**KWAN-CHAU-WAN BAY** situated about 14 miles north of Nau-chau. The entrance is narrow, and deep ; the bay affords good shelter from all winds, but is constantly infested with pirates.†

**Tides.**—The tide in Kwan-chau-wan rises about 9 or 10 feet.

**Directions.**—In vessels from Nau-chau island bound for Kwan-chau-wan by the southern channel, it is necessary that a good lookout at the masthead is kept and the lead constantly going.

From the Nau-chau anchorage, with clear weather, the mountain Kam Loong (Golden Dragon) or Toong hong Shan, bearing about S. W. by W., over 20 miles distance, may be seen ; the successive bearings of which are of great service when entering Quan-chau-wan by the southern channel. When about  $5\frac{1}{2}$  miles to the westward of Nau-chau a well wooded flat

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\* From Nau-chau to Hoi-how I could hardly keep the track, so constantly did we alter course. There was a heavy sea running at the time, and the banks were so numerous that it appeared as if we were steering through a succession of breakers.—H. C. St. John Lieut. Commanding H.M. gunboat *Opossum*, September 1865.

† See Admiralty plan of Kwan-Chau-Wan bay on sheet, No. 2,062 ; scale, 0·7 of an inch.

land will be sighted at the foot of Kam Loong, terminating in a point, which will bear about W.S.W.

From a position 8 miles westward of Nau-chau the course is about W. by N. or nearly parallel to the low coast of the island forming the southern shore of Kwan-chau-wan. When Kam Loong approaches the bearing of S. by W.  $\frac{1}{2}$  W., caution must be observed, as the water suddenly shoals from 4 to 5 fathoms to 8 feet; this depth continues for 2 miles, the course being N.W. by W. This sand bank is the only danger outside the channel, the sea does not break upon it and there is no change in the color of the water. When Kam Loong bears about S. by W.  $\frac{1}{4}$  W. the seven-storied pagoda fronting the town of Lui-chau and named by the natives Lui-chau-tap will be seen from the masthead; this pagoda will bear W. by S. when leaving the sand bank, and the depth will again be 4 and 5 fathoms.

Extending parallel with the coast, a low sandy point will next be seen forming the starboard side of the entrance to the channel into Kwan-chau-wan. On entering, the starboard shore called Satahopeng must be kept on board, and a small wooded hill with the fort and village of Cew-man will be seen on the port hand. The channel here is about  $1\frac{1}{2}$  miles wide, the track lying always within a cable from the starboard shore.

Having proceeded 5 miles from the entrance the vessel will be abreast of the great village of Tay-pien, lying on the port side of the channel, and easily distinguished by a white building close to the mouth of a creek, said to be navigable. This place affords snug anchorage in 5 fathoms, sand and mud.

After passing Tay-pien the port shore should be kept on board and two low muddy islands will be seen lying close together, between which the vessel may pass boldly in 5 fathoms. The channel here is not more than a cable broad.

A creek on the starboard hand will next be passed, leading to the village of Mat-sham, and about 15 miles to the eastward the hill Tonk-sek-Line will be seen. The north-east side of the creek is formed by a small island, which has been named Observatory island, the north point being in lat.  $21^{\circ} 10' N.$ , long.  $110^{\circ} 23' E.$  From this island steer E. by S. to cross the first bar which will be seen ahead as a straight line crossing the channel. This bar is formed by a very narrow reef with only 10 feet at low water; the entrance of Kwan-chau-wan will now be seen, and in an E.N.E. direction, the anchorage and pagoda of the same name. The channel here is narrow, a reef of black rocks, awash, lying on the starboard side, and a bank of hard sand on the port; it is marked by poles and floating spars. Passing close to these buoys a north-east course may be steered into Kwan-chau-wan.

**OU-CHEUN**, situated near a remarkable high bluff rocky mountain projecting from the main, considerably to the westward of Tien-pak, is a town with a channel leading to it; where is said to be a harbour, with water on the bar sufficient for a small vessel.

The high bluff mountain bears from Sey-ho point W.  $\frac{1}{2}$  S., and the coast to the westward of this mountain is low and sandy, scarcely visible from the masthead in 10 fathoms water.

**TIEN-PAK, or TIHEN-PIEN**, is the principal place on the south coast of China where salt is produced, and several hundred junks are employed transporting it to Canton.\*

The high land on the north-east side of the road, called Lintoa, has the appearance of a high round mountain in coming from the eastward; it is separated from the other high land to the eastward by an isthmus of white sand, and its southern extreme is called Sey-ho or Sye-ho point. From this point, E. by S.  $1\frac{1}{2}$  miles, and one mile distant from the high land, lies a reef of rocks, on which the sea often breaks, having 11 fathoms close to on the south side, with 7 fathoms regular soundings between it and the shore. From Sey-ho point, S.W. about half a mile, lies Pauk-pyah, a large white rock, having between it and the point 6 and 7 fathoms water. Foong-kye-chye, a small island, lies about  $1\frac{1}{2}$  miles to the westward of Pauk-pyah. Ty-fung-kyoh, about 2 miles to the south-westward of the latter, is of considerable height, being the outermost island of the road, in  $21^{\circ} 22\frac{1}{2}'$  N., long.  $111^{\circ} 10\frac{1}{2}'$  E.

The city of Tien-pak is walled round, and is of considerable extent; it stands at the bottom of the shoal bay on the north-east side of the harbour and can only be approached in boats at high water, through creeks that intersect the extensive flat between it and the anchorage.

**Supplies.**—A vessel touching here in distress may procure temporary masts, and get iron-work executed in the city: refreshments of all kinds may be obtained from the villages contiguous to the harbour. Some water may be obtained on the island Ty-fung-kyoh, at a small spring near the shore; but the Chinese boats will bring it from the city at a very moderate rate. It is prudent to send an officer to wait on the chief mandarin, stating the supplies wanted; and a small present to him may be useful.

**Directions.**—A small vessel in want of shelter from a N.E. or East gale, may keep near the reef of rocks to the eastward of Sey-ho point, then steer between that point and Pauk-pyah, and anchor in 4 fathoms, sand and mud, about three-quarters of a mile westward of the point, with Pauk-pyah bearing S.  $\frac{1}{2}$  E., and a pagoda on the high land near Sey-ho point

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\* See Admiralty plan :—Tien-pak harbour, with views, No. 96; scale,  $m = 2.5$  inches.



N.E. by E.  $\frac{1}{2}$  E., but no farther to the northward, for the bay is very shoal in that direction, with a rock in it above water.

Large vessels ought to pass about a mile to the southward of Pauk-pyah and Foong-kye-chye, in 7 or 8 fathoms water, and anchor in 6 fathoms between the latter and Ty-fung-kyoh, or rather a little inside this island, which will shelter them from the S.W. winds; and Foong-kye-chye and Sey-ho point will break the force of the N.E. and East winds. From the north-west and west side of Ty-fung-kyoh projects a shoal bank, with only  $2\frac{1}{2}$  fathoms; but directly inside its north point there are 6 and  $6\frac{1}{2}$  fathoms, soft bottom.

Tien-pak harbour being small, and the bar, about a mile to the N.N.E. of Foong-kye-chye, having only  $3\frac{1}{2}$  fathoms on it at high water, vessels ought not to go into it, unless they are in want of immediate repairs. When at anchor in the road, the coast from Sey-ho point to the remarkable bluff distant hill to the westward appears as one deep bay with a sandy beach, having high back land, and the entrance of the harbour is not easily discerned.

If intending to enter the harbour, anchor in  $4\frac{1}{2}$  fathoms, mud, between the north side of Foong-kye-chye and the bar, to be ready to cross over at high water. To approach this anchorage, coming from Sey-ho point, or from Pauk-pyah, two sunken rocks must be avoided: these lie between the latter and Foong-kye-chye, with 5 fathoms water close to them; they bear from Pauk-pyah W.  $\frac{3}{4}$  N. nearly one mile, and from Sey-ho point W. by S.  $\frac{1}{4}$  S.: it is therefore advisable to keep the highest part of this point bearing East, in passing to the anchorage at the bar.

On the north-west end of Foong-kye-chye there is a small sharp hummock, which having been brought to bear S.S.W., a vessel may steer on the opposite course towards the bar, and will shoal gradually. The best guide, after getting over it a little way, is for a person at the mast-head to direct the course up channel between the two dry sands; or if covered, to keep a boat on each side. The channel is not more than half a mile wide, and in it the depth increases from the bar to 7 fathoms, mud, close to a low point of sand that forms the south-east side of the harbour; and here a vessel is sheltered from all winds: this point is distant 2 miles from the bar, and bears from the small brow of Foong-kye-chye N.N.E.  $\frac{1}{2}$  E.

The channel decreases in depth to  $2\frac{1}{2}$  fathoms, where the salt-junks lie close to the salt-pans, about  $2\frac{1}{2}$  miles to the northward of the low sandy point, on which stands the village, protected by small forts on each side the harbour.

To the north-west of the bar about  $1\frac{3}{4}$  miles lies Marble rock, and nearly 4 miles farther westward there is a reef of black rocks: neither of these can be approached, the water being very shoal on that side of the bar.

**Tides.**—It is high water, full and change, on the bar of Tien-pak harbour at noon, springs rise 8 feet. After the 1st September there is almost a constant westerly current along this coast, running from a half to  $1\frac{1}{2}$  miles per hour.

**Ty-chook-chau**, is an island lying about 7 miles E. by N. from Sey-ho point, and 3 miles distant from the coast. It has rocks on the north side, stretching to the north-westward and towards the coast; but there is anchorage on its west side, in 6 fathoms, fine sand, about three-quarters of a mile off shore, where a ship will be sheltered from easterly winds; the soundings are 7 and 8 fathoms between it and the reef to the eastward of Sey-ho point.

**Chin-chew**, bearing N.E. by E.  $\frac{1}{2}$  E.  $5\frac{1}{2}$  miles from Ty-chook-chau, is high, and covered with grass; it should not be approached on the south side nearer than  $1\frac{1}{2}$  or two miles, in 10 or 11 fathoms water, for a reef of rocks, on which the sea generally breaks, projects S.  $\frac{1}{2}$  E. from it about three-quarters of a mile. Close to the east side of the island there are 8 fathoms, foul ground; to the westward, between it and Ty-chook-chau, there are 7 and 8 fathoms, gravelly bottom. The coast between these islands forms a deep bay with shoal water, having on the east side a fort and an inlet for boats, called Yue-tong, or Fish pass.

**Song-yui point**, bearing from Chin-chew E. by N.  $\frac{1}{2}$  N. about 10 miles, is the south-west extremity of the Great bay, at the north-east part of which is Hai-ling-san harbour; close to it there are 9 or 10 fathoms water. Approaching the point from the eastward, three little hummocks appear near it, with a long sandy beach between them and the high land; the bay on the west side of the point is shoal, and Song-yui town stands at its north-east angle.

**The Brothers**, distant 3 miles N.N.E. from Song-yui point, are two islets near the high land, having rocks projecting from them about half a mile; but about a mile to the eastward of them there are 8 fathoms water.

**HUI-LING-SAN HARBOUR.**—Hai-ling-shan,\* or Hui-ling san, is a high island, extending E.N.E. and W.S.W. about 12 miles, separated from the coast on the north side by a narrow passage, and having an extensive shoal bay to the north-east, and a harbour on the west side. Two small islands, sometimes named the Twins, and by the Chinese Mame-chau,† bear from Song-yui point E. by N.  $\frac{3}{4}$  N., distant 10 miles, and lie close to the south-west point of Hai-ling-shan, being united to it by a

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\* Hai is literally sea; and Shan, a high island or mountain, in the Chinese language. See Admiralty plan of Hui-ling-san harbour, with a view, No. 97; scale, *m* — 2 inches.

† Mame signifies breasts or paps, and Chau, an islet or small isle.

reef and sand-bank. They form the outer point of Hui-ling-san harbour ; and in coming from the eastward, being on with each other, appear as a single island.

Bluff point, bearing E. by N. 3 miles from the Mame-chau islands, is high, and has 9 and 10 fathoms water close to ; between them the land is cultivated, and forms a bay. There is also a bay with a large sandy beach to the eastward of Bluff point ; and 4 miles N.E. by E.  $\frac{3}{4}$  E. from that point are two rocky islets close together, appearing as three small hummocks ; they may be passed at the distance of a mile in 7 or 8 fathoms water. A little inland from these stands Sugar Loaf hill, which does not show its peak when seen to the eastward of Bluff point.

Close to the east point of Hai-ling-shan, and bearing E. by N.  $\frac{3}{4}$  N., distant  $5\frac{1}{2}$  miles from the two rocky islets, there is a small island, having 7 fathoms water close to it, and to the east end of Hai-ling-shan ; but S.W. by S.  $1\frac{1}{4}$  miles from the small island, there is a reef of rocks nearly covered at high water, which has 6 fathoms close to, and may be passed about a mile off in 7 or 8 fathoms. On the east part of Hai-ling-shan, contiguous to the sea, there is a remarkable patch of red sand, discernible when off the Mandarins cap.

**Directions.**—To sail into the harbour, if coming from the eastward, pass about a quarter of a mile from the south side of the Mame-chau in 8 fathoms water, and round them about the distance of a cable in 7 fathoms. On the brow of the western islet there is a remarkable stone, and N.  $\frac{3}{4}$  W. from it about half a mile lies a sand-bank, having only  $2\frac{1}{4}$  fathoms on it at low-water spring tides. From the same stone, Deep-water point, the next prominent point to the northward, bears N.N.E., distant rather more than half a mile, and the space between it and the Mame-chau is dry at low water. Having rounded the western Mame-chow, steer direct for Deep-water point, which passes at rather less distance than a cable's length, for the edge of the  $2\frac{1}{4}$ -fathoms bank is within a quarter of a mile of it.

From the Mame-chau the depths are 7 and 8 fathoms, until they increase suddenly to 9 and 10 fathoms near Deep-water point. From this point N.N.E.  $\frac{3}{4}$  E. about a mile, there is a small hill covered with trees, and a fort on its summit, not easily discerned : steer from Deep-water point direct for the fort, until abreast of Teep-chau, a small island about midway between them. After passing the point, the depth will suddenly decrease to 6, then to 5 fathoms near Teep-chau, to the westward of which, about a quarter of a mile distant, large vessels should anchor with the fort bearing N.E. by N. The anchorage is rather confined for more than two large vessels ; and although this harbour is safe, it should only be resorted to by large vessels in a case of necessity.

About half a mile westward from Teep-chau the water is shoal over a sandy bottom; and deepens again in a narrow gap, to the westward of which there are breakers about  $1\frac{1}{4}$  miles from the fort. There is a small peaked islet about two miles N. by E. from the fort, and between them some rocks, dry at low water; a ship should not pass the fort, the water to the northward being shoal.

The  $2\frac{1}{4}$  fathoms bank is small, and steep to the east side; it bears S.W. from the fort, and W.  $\frac{3}{4}$  S. from Deep-water point. On the north-west extreme of Hai-ling-shan there is a small peaked hill, bearing from Deep-water point N.N.E., distant about 4 miles; when this peaked hill and the peaked islet are in one bearing N.N.E.  $\frac{1}{4}$  E. the  $2\frac{1}{4}$  fathoms bank is on the same line of bearing. A small vessel may pass to the westward of the bank in 4 fathoms, sandy bottom, but not advisable for a large one.

The tides are sufficiently strong to admit a vessel to *back* and *fill* from Mame-chau to the anchorage, as the channel is too narrow for working. The harbour may be considered safe, being sheltered from southerly winds by Mame-chau point, and mount Look-out, 740 feet high; by other high land of the island from East and N.E. winds; and by the high land of Koan on the opposite coast from westerly winds. The west side of the bay, between the Mame-chau and the Brothers, should not be approached under 5 fathoms water, the bottom being sandy, with shoal water under that depth.

**Supplies.**—The bay between Teep-chau and Deep-water point has only  $2\frac{1}{2}$  fathoms water; here, adjacent to a small joss-house in ruins, fresh water may be procured.

The harbour for small vessels is in the bay formed between Teep-chau and the fort, where the depths are 8 and 9 feet; Chino village stands in this bay, where water and refreshments are obtained; carpenters and caulkers may be got to work on board, and smith's work can be executed at the village.

**Tides.**—It is high water, full and change, in Hui-ling-san harbour, about 8.30m. springs rise from 7 to 8 feet.

**TY-OA POINT and BAY** are about 16 miles E.N.E. from the east end of Hai-ling-shan, and N.N.W.  $\frac{1}{4}$  W.,  $16\frac{1}{2}$  miles from Mandarin's Cap. The depths decrease regularly coming from Mandarin's Cap, to  $4\frac{1}{4}$  fathoms at low water close to Ty-oa point; inside the point, and in the extensive bay to the north-westward, the water is shoal. Ty-oa village is round within the point, and is the residence of a mandarin; here a large vessel might procure water, or get a letter forwarded to Canton; but the soundings are too shoal to anchor under shelter of the point, except for small vessels. There is a white building amongst some trees on an elevated point a little inside Ty-oa point, by which the approach

from the southward to this place may be known. A small vessel may anchor within half a mile of the point, in 3 or  $3\frac{1}{2}$  fathoms at low water, and be sheltered from easterly winds; but she must not go near the island that lies a little inside, as some rocks covered at high water, with 4 fathoms close to them, project to the southward of it; they bear from Ty-oa point W.  $\frac{1}{2}$  N., distant  $1\frac{1}{4}$  miles. Close to the town there are  $2\frac{1}{2}$  fathoms water where the salt-junks take shelter when chased by the pirates, and are protected by two old batteries.

The following islands and rocks lie off the coast, between Hai-ling-shan and Hawcheun :—

**Mandarin's Cap**, named Fan-shee-ak (White Rock) by the Chinese, in lat.  $21^{\circ} 28' N.$ , long.  $112^{\circ} 21\frac{1}{2}' E.$ , is a barren white rock, about 200 feet high, converging gradually to the summit, and terminating in a sharp peak: near it, to the northward, lie two other rocks, one of which is very small. From Mandarin's Cap, Nam-o harbour bears N.E. by E. distant 13 miles, and the south end of St. John island E. by N.  $\frac{1}{2}$  N., nearly 24 miles. On the south and west sides there are 15 and 16 fathoms, mud bottom, within a cable of the rock, and 13 fathoms a little to the northward.

**Currents.**—In August and September, when easterly winds frequently prevail, the current sometimes sets to the westward 3 miles per hour off Mandarin's Cap; abating only to  $1\frac{1}{2}$  miles per hour when the tide, under ordinary circumstances, would be setting to the eastward. The westerly current constantly prevails along this coast during the easterly monsoon, and frequently in the south-west monsoon, particularly if the wind veer to the eastward.

**Nam-Pang island**, bearing N.W. by W.  $\frac{3}{4}$  W., distant  $10\frac{1}{2}$  miles from Mandarin's Cap, is high at the west end, and about  $1\frac{1}{2}$  miles in length. It is safe to approach, having 9 and 10 fathoms near the shore all round, but is destitute of fresh water. On the north side, a small bay nearly separates the island into two parts.

**Round island**, bearing West  $3\frac{1}{2}$  miles from Nam-pang, is small and named from its appearance. To the S.S.W. of it about 2 miles there are two rocks awash, with 10 fathoms water between them and the island, and no hidden danger.

**Quoin** is an islet resembling a gunner's quoin, lying near the east side of Nee-wok island, and  $2\frac{3}{4}$  miles N.N.W. of Nam-pang; the passage between it and the latter has 8 and 9 fathoms water, and is clear of danger.

**Nee-Wok** is an island of moderate height, about a mile in length, bearing from Nam-pang N.W.  $\frac{3}{4}$  N. about  $3\frac{1}{2}$  miles. There is a small rock

above water between it and the Quoin, but no other danger; the depths being 8 and 9 fathoms close to it all round.

**Ty-Wok**, about  $1\frac{1}{2}$  miles N.N.W. of Nee-wok, is high, appearing like a saddle when viewed from the S.W. There are 8 fathoms, soft bottom, in the passage between this island and Nee-wok; and S.W. by S. one mile from Ty-wok, and N.W.  $\frac{1}{2}$  W. from the summit of Nam-pang, there is a rock with 7 fathoms all round, which is generally visible 3 or 4 feet above water, and the sea always breaking upon it, renders it conspicuous in passing. The depths between Ty-wok and the east end of Hai-ling-shan, from which it is distant 7 miles, are 7 and 8 fathoms; and to the N.E., between it and Ty-oa point, they are 5 and 6 fathoms.

**Water**.—There is a little bay on the north side of Ty-wok, where fresh water can be procured, to the westward of a small temple near the beach.

**Mong-Chau**, bearing N.N.E.  $11\frac{1}{2}$  miles from Mandarin's Cap, is a high island, about  $2\frac{1}{2}$  miles in length, and covered with verdure. There is a town near its summit, only discoverable from the south-east; some rocks lie off its north-east point.

Small vessels may anchor in 3 fathoms at low water, on the west side of this island, during easterly winds; and fresh water may be procured at a small beach on that side, near the south point. There are only 2 and 3 fathoms at low water in the passage between the north end of the island and the coast, and 2 fathoms in the channel between it and Hawcheun; but the bottom is all soft, with a very regular decrease in depth from Mandarin's Cap to these islands.

**HAWCHEUN**, or False St. John, is a high island, extending N.E. and S.W. about 11 miles. The south-west end, in lat.  $21^{\circ} 35' N.$ , long.  $112^{\circ} 31\frac{1}{2}' E.$ , is a bluff point, having 7 and 8 fathoms water close to; and close round it on the west side there are two small bays, with sandy beaches, having  $3\frac{1}{2}$  fathoms water, where small vessels may take shelter.

A large vessel will be sheltered from easterly winds by anchoring in 5 or 6 fathoms, soft mud, about a mile off. The ship *Gunjavar*, in 1787, anchored here in  $6\frac{1}{2}$  fathoms, about  $1\frac{1}{2}$  miles off shore, with the south point of Hawcheun bearing S.E. by S., the village Ty-han N.E. by E.  $\frac{1}{2} E.$ , observed lat.  $21^{\circ} 36' N.$  A few bullocks and other refreshments were procured at the village, and fresh water in the southernmost small bay. This anchorage is generally named Hawcheun road or bay.

**NAMO HARBOUR** is formed between the south-west end of Hawcheun and Namø island, and although rather small, it is safe and convenient for refitting a ship, after being disabled by a typhoon, or otherwise requiring shelter. The south or large entrance is about  $1\frac{1}{2}$  miles eastward

of the high bluff south-west point of Hawcheun, and is preferable to the eastern entrance for ships drawing above 16 feet water; having 6 fathoms in it, gradually decreasing to the sandy beach at the village of Namó fronting it, and no danger whatever; it is three-quarters of a mile wide, having an islet on the east side, named Passage island, joined to the west point of Namó by a few rocks. With an easterly wind, the best anchorage for a large vessel is about half way between Passage island and Green point, which has a round mound on it covered with grass, and forms the north-west point of Namó. Here she will have  $4\frac{1}{2}$  or 5 fathoms, soft mud, at low water, according as her berth is near to or farther from Namó, and will be sheltered by this island, which is 500 feet high, to the eastward, and by the high land of Hawcheun to the northward, round to S.W.; from whence, if it blow strong, a long ground swell rolls in, rendering it necessary to move further in, to the western part of the harbour, where there are  $4\frac{1}{2}$  to 4 fathoms, mud, at low water.\*

The eastern entrance, between Namó island and the south-east part of Hawcheun, has  $4\frac{1}{2}$  fathoms, gradually decreasing inside to  $3\frac{1}{2}$  fathoms at low-water springs; and although it is the most contracted of the two, will be found convenient for small ships.† The best berth for a small vessel is abreast the sandy beach on Namó, which forms Green point; not so far in as to open the south entrance, but to see it over the narrow neck of that point. In this berth she will have 3 fathoms at low water springs, and will be in a good position to protect the boats when watering; although exposed to the wind between E.N.E. and E. by S., no swell of consequence can roll in, being prevented by the islands that lie contiguous to the entrance.

**Supplies.**—There are several watering-places about the harbour, the largest and most convenient of which is in Watering bay, a sandy bay on Hawcheun, bearing from Green point N.N.E.; here the water comes close to the beach.

Barren island, about a mile to the northward of Green point, has a white conical rock inside of it; both are connected with Hawcheun at low water, and separate Watering bay from Namó bay, in which is Namó village,‡ consisting of about 100 brick houses, at a small distance from the

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\* See Admiralty plan of Namó harbour, with a view, No. 98; scale,  $m = 2.5$  inches.

† The channel inside Namó island is, with the exception of a few narrow passages of about 90 or 100 feet wide, staked completely across; but vessels very soon shoot through them.—H.M.S. *Renard*, 1850.

‡ Strangers landing here, or at similar places where there is no fort, nor resident mandarin, ought to be on their guard, in case of meeting with any of the crews of the Ladrone boats; for they frequently land, and put the defenceless villages under contribution, and might make prisoners of Europeans, when that can be done with safety, in hope of getting a large sum for their ransom.

shore. Here a few refreshments and fish may be procured; but the serf renders landing difficult, when the wind blows strong from the southward: it is then proper to land to the eastward of Barren island.

**Tides.**—It is high water, full and change, in Namu harbour at about 10h.; springs rise 7 to 8 feet; and then a small drain of ebb sets out through each of the channels.

**Directions.**—To enter Namu harbour by the eastern entrance, if coming from the eastward, after rounding the south end of St. John tolerably close, steer about W. by N., or, if the ebb be running, more northerly, this course will lead near the Boat rock, which bears from St. John south point W.  $\frac{3}{4}$  N., distant 7 miles. It has 7 fathoms water close to, is about the size of a large boat, never entirely covered, and the sea generally breaks on it. About three-quarters of a mile N. by W.  $\frac{3}{4}$  W. from this rock lies Round island, the southernmost of a chain of five rocky islets fronting the east side of Hawcheun. Having passed a short distance southward of Boat rock, steer about W.N.W. for the entrance of the harbour, distant 3 miles, taking care to avoid the rocks, which have 7 fathoms close to them, projecting nearly three-quarters of a mile from the south-east part of Namu.

**The Five Islands,** fronting the east side of Hawcheun, are mostly small, and bound the west side of the channel between it and St. John; there are also rocks, high above water, near its south side. Wasp island, next to the northward of Round island, is the largest of the group; high at each end, and nearly separated in the middle, with some rocks close to its east side. Cricket, the third island, is high, and covered with grass. The fourth, called Pipachau, is of middling height, covered with grass, having some rocks above water projecting off its south end: there are  $4\frac{1}{2}$  fathoms water close to these rocks, and also between them and the other island to the southward, and the same depth close to the east side of Pipachau. The fifth, or northernmost island, lies nearest the Hawcheun shore, with 4 fathoms at low water between it and that shore.

There is no hidden danger near these islands, and a vessel drawing no more than 15 feet water may either pass or anchor between them and Hawcheun, keeping rather nearer to the island. Here she will find shelter in 3 or  $3\frac{1}{2}$  fathoms, soft ground, at low water, and can be supplied with refreshments from the town of Hawcheun, which stands in a small bay fronting the islands.

All the space between these islands and St. John is clear from hidden danger, with depths of 5 and 6 fathoms, soft ground. The tides are strong in the springs, the ebb setting southward, and the flood northward through the channel, and rise and fall about 7 feet. During the neaps they are weak, and much influenced by the winds.



To the northward of the Five islands the depths increase to  $4\frac{1}{2}$  and 5 fathoms, in a direct line towards the west point of St. John, and continue the same in passing about mid-channel between this point and the island lying off the north-east end of Hawcheun. Here is the narrowest part of the channel, which is about a mile wide, where vessels may be sheltered during bad weather. The entrance of the channel, generally called St. John road or bay, between the south part of St. John, and the Five islands, is more open to blowing weather; for some ships at anchor there have been obliged to cut their cables and put to sea. The *Bombay*, after cutting away her main-mast in a typhoon, to prevent being driven on the rocks, was afterwards obliged to cut from her anchors, and the pilot ran her on 'shore in the mud, upon the coast to the westward of Mong-chau; here she remained one spring, and was obliged to take out part of her cargo before she floated.

**St. JOHN ISLAND**, or Chang Cheun-cham, in length about 15 miles N.N.E. and S.S.W., has been generally considered as two islands; for in coming from the eastward or westward, the high land on each extremity appears separated by a large gap, which, on a near approach, is found to be a low, narrow isthmus of sand, uniting the high land, and having a bay on each side.

There are 7 and 9 fathoms near the east side of the island, and no hidden danger, excepting a small rock, visible only at low water, lying off a bluff point, about 2 miles to the southward of the north-east point of the island, from whence the land stretches to the south-westward. About a mile off the north-east point of the island there are some rocks, always above water, with a passage of 8 and 9 fathoms between them and the point; and to the northward of them there are 5 and 6 fathoms.

On the north side of the island are two small bays separated by a narrow peninsula. The western bay, called Sam-chau-tong, or Tree island bay, is the largest, with several small islands in it, and only  $2\frac{3}{4}$  fathoms water within the point; there is a village in this bay, where refreshments may be obtained. All this side the island is free from danger, the depth generally between 4 and 5 fathoms near St. John, decreasing gradually towards the land to the northward, which is distant 6 or 7 miles. The bottom is all soft mud, and probably the north-west side of St. John is a safe place during a typhoon; for if a ship drag her anchors and settle in the mud, the risk of sustaining damage cannot be great. Several ships drawing 19 or 20 feet water have been carried by the pilots between Hawcheun and St. John, round the north end of the latter, and between the Great and Little Wizard rocks. In April 1787, the *Gunjavar* went through this channel, drawing 20 feet.

The large bay on the west side St. John, opposite the sandy low isthmus, extends into the island about 4 miles; but a vessel of heavy draft cannot enter it, the water being shoal 18 to 12 feet.

**Shitoe or Satye Bay**, on the south-west side of St. John, has 6 and 7 fathoms water at the entrance, and a small vessel may go farther in, and anchor in 4 or  $3\frac{1}{2}$  fathoms; but it is too narrow for a large vessel unless she were to warp in.\*

There is a watering-place at the south side of the entrance, and a village at the bottom of the bay; which, with several others on the island, have suffered much from the depredations of the pirates, who often haul their vessels up here to clean their bottoms. Close to the islet and detached rock off the north-west point of the bay there are 6 fathoms water.

Between Shitoe bay and the south point of St. John there is another small bay, having 6 fathoms water, and 10 fathoms close to some rocks, which lie off its south-west point, and in that direction about a mile.

**Wycaup** is a small, high, rocky island, fronting the south-east end of St. John island, being separated from it by a narrow passage. There are 13 and 14 fathoms water close round this island on the outside.

**Lieuchieu** is an island of moderate height and barren aspect, separated from Wycaup and the south-east part of St. John by a safe channel  $2\frac{1}{2}$  miles wide, with 13 to 15 fathoms water; and there is deep water close to the island all round, 17 and 16 fathoms on the south side, 13 fathoms on the north side, decreasing gradually to 10 fathoms close to the outermost Wizard rocks, from which it bears S.W.  $\frac{1}{2}$  S., distant 12 miles.

**The Wizard Rocks** lie off the south end of Ty-kam, between St. John and Coucock island. The outermost, named the Flies, consist of a group of five or six rocks, about 30 feet high, having 10 fathoms mud, at the distance of a cable from them. The Great or South Wizard rock bears from the Flies N. by W.  $\frac{3}{4}$  W., distant one mile; and  $1\frac{3}{4}$  miles northward from it lies a white conical rock, called the Inner or White Wizard. Near the South Wizard the depths are 6 and 7 fathoms, and near the White Wizard about 5 fathoms, soft ground. S.W. three-quarters of a mile from the White Wizard, there is a rock, covered at high tide, making it necessary for a vessel passing between them to keep nearest to the South Wizard. There is another rock, always above water, bearing W. by N. from the White Wizard, having 4 fathoms near it; and there is a passage with  $4\frac{1}{2}$  fathoms water between the White Wizard and the south point of Tykam.

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\* See Admiralty plan of Shitoe bay, No. 1,022; scale,  $m = 1\cdot5$  inches.

**Tykam island**, lying to the northward of the Wizard rocks, is of considerable height, of darker aspect than the other land, and in clear weather appears with red streaks. On the south part, in a small bay fronting the Wizard rocks, behind a mound of sand near the beach, there is a village, and fresh water may be obtained at the western side of the beach. Between this island and Tonqua, the next island to the westward, the water is shoal, and also in the large space to the westward of Tonqua.

**Coucok**, the next island to the eastward of Tykam, is high, and 4 miles in extent east and west. Its south-west point has a remarkable rock close to it, resembling a boat under sail. The west side of the island is formed by a steep hilly ridge stretching north and south, having good anchorage under it in 6 fathoms, where ships are sheltered from N.E. and East winds; and there are 6 or 7 fathoms close to the south side of the island. Fresh water may be obtained at the westernmost of two small bays on the north side the island.

**Tymong island** lies to the northward of Coucok, having an islet, called Samcok, joined to its south-west point by rocks visible at low water. Between Tykam and Samcok the depths are 3 fathoms; and there is a channel of 3 fathoms, about  $1\frac{1}{2}$  miles wide, between the latter and the north-west end of Coucok.

**Tylou** a high island, with a large white patch on its eastern side, is separated from Coucok by a channel about 2 miles wide, with 7 and 6 fathoms water in it, decreasing gradually towards Tymong, which fronts the channel to the north-west. By passing close round the east point of Coucok, it appears that vessels of moderate draught might anchor to the northward of that point in 5 fathoms, sheltered from most winds; and small vessels may find good shelter from easterly winds, by anchoring close under the west part of Tylou in 4 fathoms. The south and south-east sides of Tylou are safe to approach, having 6 and 7 fathoms close to them.

## TABLE OF POSITIONS.\*

| Place.                                       | Particular Spot.                  | Latitude. | Longitude. | Authorities. |
|----------------------------------------------|-----------------------------------|-----------|------------|--------------|
| ISLANDS BETWEEN BORNEO AND SINGAPORE STRAIT. |                                   |           |            |              |
| Datu island -                                | N.E. part -                       | 0 8 11N   | 108 36 10E | Reed.        |
| Direction island -                           | South point -                     | 0 14 19   | 108 1 50   | "            |
| St. Barbe island -                           | West, side (centre).              | 0 7 26    | 107 11 40  | "            |
| St. Esprit group -                           | Head island, S. point.            | 0 35 45   | 107 4 30   | "            |
| Tamban island (Tambelan group).              | Observatory station               | 1 0 27    | 107 24 10  | "            |
| St. Julian island -                          | N.E. part -                       | 0 55 22   | 106 44 0   | "            |
| Victory island -                             | South point -                     | 1 34 41   | 106 18 30  | "            |
| St. Pierre rock -                            | " -                               | 1 51 42   | 108 39 0   | Belcher.     |
| ANAMBA ISLANDS.                              |                                   |           |            |              |
| White rock -                                 | - -                               | 2 20 0    | 105 34 0   | Various.     |
| Pulo Repon -                                 | - -                               | 2 25 0    | 105 52 0   | "            |
| Pulo Domar -                                 | - -                               | 2 45 0    | 105 25 0   | "            |
| NATUNA ISLANDS.                              |                                   |           |            |              |
| Marundum island -                            | S.E. point -                      | 2 2 55    | 169 6 10   | Reed.        |
| Low island -                                 | - -                               | 3 0 0     | 197 48 0   | Various.     |
| Pyramidal rocks -                            | - -                               | 4 3 0     | 107 21 40  | "            |
| Semione island -                             | - -                               | 4 31 0    | 107 42 30  | "            |
| MALAY PENINSULA—EAST COAST.                  |                                   |           |            |              |
| Pulo Eu -                                    | - -                               | 2 7 0     | 104 17 0   | Thompson.    |
| Pulo Aor -                                   | S. peak -                         | 2 26 30   | 104 32 0   | "            |
| Pulo Varela -                                | - -                               | 3 18 0    | 103 38 0   | Various.     |
| Pulo Brala -                                 | - -                               | 4 49 0    | 103 38 0   | "            |
| EASTERN SIDE OF MAIN ROUTE OF CHINA SEA.     |                                   |           |            |              |
| Charlotte bank -                             | Rifeman's anchorage in 8 fathoms. | 7 7 19    | 107 36 50  | Reed.        |
| Vanguard bank -                              | Centre -                          | 7 28 45   | 109 38 20  | Ward.        |
| Grainger bank -                              | Centre -                          | 7 47 48   | 110 29 30  | "            |
| Prince Consort bank -                        | S. W. extreme -                   | 7 48 50   | 109 55 40  | "            |
| Prince of Wales bank -                       | Centre -                          | 8 8 30    | 110 32 30  | "            |
| Alexandra bank -                             | 3-fathoms patch -                 | 8 1 30    | 110 36 40  | "            |
| Rifeman bank -                               | 11-feet patch -                   | 7 55 20   | 111 42 0   | "            |
| Ladd reef -                                  | E. extreme -                      | 8 40 19   | 111 41 30  | "            |

\* The positions by Messrs. Bullock, Reed, Richards, Stanley, Stanton, Ward, and Wilds depend upon Fullerton battery, Singapore, being in Longitude 103° 51' 18" East of Greenwich. The positions by Bate, Belcher, and Gordon, depend upon Manila cathedral, being in Longitude 120° 58' 8" East of Greenwich.

| Place. | Particular Spot. | Latitude. | Longitude. | Authorities. |
|--------|------------------|-----------|------------|--------------|
|--------|------------------|-----------|------------|--------------|

EASTERN SIDE OF MAIN ROUTE OF CHINA SEA—*cont.*

|                                         |                                |          |            |       |
|-----------------------------------------|--------------------------------|----------|------------|-------|
| Spratly island -                        | Centre -                       | 8 38 0 N | 111 55 0 E | Ward. |
| West London reef -                      | Sandy cay -                    | 8 52 51  | 112 15 30  | "     |
| East London reef -                      | East end -                     | 8 49 38  | 115 38 10  | "     |
| Cuarteron reef -                        | E. extreme -                   | 8 50 54  | 112 50 8   | "     |
| Fiery Cross or N. W. Investigator reef. | Centre -                       | 9 36 38  | 112 54 30  | Reed. |
| Discovery Great reef -                  | S. End -                       | 10 0 42  | 113 51 30  | "     |
| Discovery Small reef -                  | - -                            | 10 1 30  | 114 1 30   | "     |
| Western or Flora Temple reef.           | Centre -                       | 10 15 0  | 113 37 0   | "     |
| Itu Aba island -                        | Tree on S.W. side              | 10 22 42 | 114 21 10  | "     |
| Loai-ta or South island -               | N.W. extreme -                 | 10 40 45 | 114 24 50  | "     |
| Soubie reef -                           | S.W. end -                     | 10 53 30 | 114 3 40   | "     |
| Thi-tu island -                         | Tree on S.W. end               | 11 3 9   | 114 16 20  | "     |
| Trident shoal -                         | Centre of patch at N. extreme. | 11 31 30 | 114 39 10  | "     |
| Lys shoal -                             | 17-foot patch -                | 11 19 40 | 114 34 20  | "     |
| North Danger reef -                     | Tree on N.E. cay               | 11 28 0  | 114 20 40  | Ward. |

## WESTERN SIDE OF MAIN ROUTE.

|                                     |                             |          |           |               |
|-------------------------------------|-----------------------------|----------|-----------|---------------|
| Large island of Pulo Condore group. | Landing-place in Great bay. | 8 40 57  | 106 36 10 | Wilds & Reed. |
| Pulo Sapatu -                       | Summit -                    | 9 58 23  | 109 6 0   | Reed.         |
| Pulo Ceicer de Mer -                | S.W. hill -                 | 10 32 36 | 108 56 30 | "             |
| Paracel islands and reefs :         |                             |          |           |               |
| Triton island -                     | - - -                       | 15 46 0  | 111 11 0  | Ross,         |
| Lincoln island -                    | S.E. point -                | 16 39 34 | 112 44 20 | Ward.         |
| Observation bank -                  | - - -                       | 16 36 0  | 111 40 30 | Ross.         |
| Woody island -                      | - - -                       | 16 50 30 | 112 19 0  | "             |
| St. Esprit shoal -                  | Centre -                    | 19 33 0  | 113 2 0   | Reed.         |
| Helen shoal -                       | " - -                       | 19 12 0  | 113 53 40 | "             |

## BORNEO—N.W. COAST.

|                                  |                                      |         |           |                                     |
|----------------------------------|--------------------------------------|---------|-----------|-------------------------------------|
| Tanjong Api -                    | - - -                                | 1 56 36 | 109 19 0  | Chart, No. 1746.                    |
| Tanjong Datu -                   | - - -                                | 2 5 15  | 109 39 10 | Reed.                               |
| Sarawak river -                  | Resident's house -                   | 1 33 4  | 110 20 40 | "                                   |
| Barram point -                   | - - -                                | 2 36 15 | 113 59 0  | "                                   |
| Gunung Malu -                    | Summit -                             | 4 5 20  | 114 55 10 | Belcher.                            |
| Bruni bluff -                    | Extreme -                            | 5 3 0   | 115 3 20  | Gordon.                             |
| Bruni river -                    | Palace -                             | 4 52 40 | 114 55 20 | "                                   |
| Labuan group, Victoria harbour - | Ramsey point flagstaff -             | 5 16 33 | 115 15 15 | Mean of Belcher, Richards, and Reed |
| Mangalam island -                | S.W. point -                         | 6 10 40 | 116 35 20 | Gordon.                             |
| North Furious shoals -           | Rifleman's anchorage in 11 fathoms - | 7 3 19  | 116 18 15 | Reed.                               |

## TABLE OF POSITIONS.

| Place.                                    | Particular Spot.               | Latitude. | Longitude. | Authorities. |
|-------------------------------------------|--------------------------------|-----------|------------|--------------|
| BALABAC AND ADJACENT ISLANDS.             |                                |           |            |              |
| Balabac island -                          | Balabac peak -                 | 7 55 50 N | 117 3 0 E  | Reed.        |
| „ Dalawan bay.                            | Watering place -               | 7 53 48   | 117 3 50   | Reed.        |
| PALAWAN ISLAND—WEST COAST.                |                                |           |            |              |
| Cape Buliluyan, south extreme of Palawan. | -                              | 8 20 25   | 117 9 40   | Bate.        |
| Bulanhow mountain -                       | Highest part -                 | 8 36 25   | 117 21 10  | „            |
| Mantaleengahan mountain.                  | „ „ -                          | 8 49 22   | 117 39 30  | „            |
| Ilaan hill -                              | „ „ -                          | 8 55 10   | 117 31 40  | „            |
| Gantung peak -                            | „ „ -                          | 8 57 53   | 117 47 50  | „            |
| Eran quoin -                              | „ „ -                          | 9 3 25    | 117 38 50  | „            |
| Pu-lute peak -                            | „ „ -                          | 9 8 8     | 117 56 10  | „            |
| Malapakkun island -                       | „ „ -                          | 9 14 50   | 117 50 10  | „            |
| Victoria peak -                           | „ „ of range -                 | 9 22 30   | 118 17 30  | „            |
| Aniphan -                                 | Huts -                         | 9 43 50   | 118 27 10  | „            |
| Thumb peak -                              | Highest part of range.         | 9 47 45   | 118 35 30  | „            |
| Ulugan bay -                              | Observatory rock               | 10 6 11   | 118 46 30  | „            |
| Cleopatra needle -                        | Highest part of range.         | 10 7 38   | 118 59 10  | „            |
| May-day bay -                             | Watering place -               | 10 24 22  | 119 1 50   | „            |
| Port Barton -                             | Bubon point -                  | 10 29 19  | 119 5 30   | „            |
| Cacnipa or High island -                  | Highest part -                 | 10 30 10  | 119 3 40   | „            |
| Mount Capoas -                            | „ „ -                          | 10 48 10  | 119 17 0   | „            |
| Entrance of Malampaya sound.              | Round islet -                  | 10 59 25  | 119 14 10  | „            |
| Panco village -                           | Stockade -                     | 10 52 9   | 119 23 0   | „            |
| Bacuit bay -                              | Old village -                  | 11 2 30   | 119 25 0   | „            |
| Bacuit village or Talandac.               | Stockade -                     | 11 11 0   | 119 23 0   | „            |
| The Horn, Matinloc -                      | Highest part -                 | 11 11 0   | 119 16 40  | „            |
| High Table range -                        | „ „ -                          | 11 14 45  | 119 27 50  | „            |
| North extreme of Palawan.                 | Highest part of Cabuli island. | 11 26 25  | 119 29 40  | „            |
| PALAWAN—EAST COAST.                       |                                |           |            |              |
| Ursuli island -                           | W. end -                       | 8 20 42   | 117 30 0   | „            |
| Point Sir James Brooke -                  | -                              | 8 46 0    | 117 48 40  | „            |
| East island -                             | N.W. extreme -                 | 8 53 45   | 118 14 0   | „            |
| Port Royalist -                           | Tide-pole point -              | 9 43 43   | 118 43 0   | „            |
| Bold point -                              | -                              | 10 1 45   | 119 9 0    | „            |
| Mount Baring -                            | -                              | 10 24 55  | 119 33 0   | „            |
| Dumaran island, east extreme.             | Pirate head -                  | 10 34 40  | 120 0 10   | „            |
| — village -                               | Fort -                         | 10 32 0   | 119 45 50  | „            |
| Tai-Tai village -                         | Fort -                         | 10 50 0   | 119 31 0   | „            |
| Santa Monica village -                    | Stockade -                     | 11 18 0   | 119 33 40  | „            |
| East peak -                               | Highest part -                 | 11 17 40  | 119 31 30  | „            |
| Observatory island -                      | W. side -                      | 11 30 17  | 119 39 30  | „            |

| Place.                             | Particular Spot. | Latitude.   | Longitude.   | Authorities.    |
|------------------------------------|------------------|-------------|--------------|-----------------|
| WEST COASTS OF PHILIPPINE ISLANDS. |                  |             |              |                 |
| Green island -                     | -                | 12° 3' 0" N | 119° 47' E   | Various.        |
| Calivite island -                  | -                | 12° 21' 30" | 119° 53' 30" |                 |
| Paluan -                           | -                | 13° 23' 30" | 120° 29' 20" | Bate.           |
| Cape Calavite -                    | -                | 13° 26' 0"  | 120° 18' 0"  | Various.        |
| Cabra island -                     | S.W. extreme -   | 13° 52' 30" | 120° 2' 30"  | "               |
| Mangarim bay -                     | Sandy tongue -   | 12° 20' 0"  | 121° 2' 10"  | Belcher.        |
| Garza bay -                        | Garza island -   | 12° 12' 26" | 121° 10' 50" | "               |
| Fortune island -                   | -                | 14° 2' 45"  | 120° 28' 30" | "               |
| Manila -                           | Cathedral -      | 14° 36' 3"  | 120° 58' 10" | Various.        |
| Point Capones -                    | -                | 14° 54' 0"  | 120° 3' 0"   | "               |
| Dile point -                       | -                | 17° 34' 30" | 120° 20' 30" | "               |
| Cape Bojeador -                    | -                | 18° 30' 0"  | 120° 34' 0"  | "               |
| Scarborough shoal -                | S.W. part -      | 15° 6' 44"  | 117° 44' 0"  | Wilds & Stanley |
| Pratas island -                    | N.E. end -       | 20° 42' 3"  | 116° 43' 20" | Richards.       |
| " reef -                           | N.E. point -     | 20° 47' 0"  | 116° 53' 0"  | "               |

## SHOALS IN PALAWAN PASSAGE.

|                         |                                     |            |              |            |
|-------------------------|-------------------------------------|------------|--------------|------------|
| South Luconia shoals -  | Luconia breakers -                  | 5° 3' 24"  | 112° 41' 30" | Reed.      |
| North " " -             | Seahorse breakers -                 | 5° 31' 0"  | 112° 34' 0"  | "          |
| " " " -                 | N. part of Friendship shoal. -      | 5° 59' 30" | 112° 31' 30" | "          |
| Louisa shoal -          | S.W. rock -                         | 6° 19' 45" | 118° 18' 30" | Bate.      |
| Royal Charlotte shoal - | -                                   | 6° 56' 30" | 113° 35' 15" | Horsburgh. |
| Half moon shoal -       | Inclined rock on E. side. -         | 8° 51' 45" | 116° 16' 45" | Bate.      |
| Royal Captain shoal -   | Observation rock, at N. extreme. -  | 9° 1' 45"  | 116° 39' 30" | "          |
| Bombay shoal -          | Madagascar rock, on N.E. extreme. - | 9° 26' 7"  | 116° 56' 0"  | "          |

## GULF OF SIAM.

|                                    |                                                                   |             |              |           |
|------------------------------------|-------------------------------------------------------------------|-------------|--------------|-----------|
| Great Redang island -              | Bukit Mara -                                                      | 5° 44' 21"  | 103° 1' 40"  | Richards. |
| Koh Krah -                         | S.E. point -                                                      | 8° 24' 47"  | 100° 45' 30" | "         |
| Wha e Wan, South horn -            | Middle of N.E. side of S. peninsula. -                            | 11° 45' 28" | 99° 48' 30"  | "         |
| Paknam flagstaff, Bangkok river. - | -                                                                 | 13° 35' 53" | 100° 34' 10" | "         |
| Koh Lüem -                         | Peak -                                                            | 12° 57' 30" | 100° 38' 40" | "         |
| Cape Liant -                       | N.W. rock of Koh Mesan. -                                         | 12° 35' 8"  | 100° 56' 50" | "         |
| Koh Chang -                        | Small island on W. side. -                                        | 12° 1' 20"  | 102° 15' 50" | "         |
| Pulo Way -                         | S. extreme of sandy bay, near middle of N.E. side of W. island. - | 9° 55' 11"  | 102° 53' 30" | "         |
| Pulo Obi -                         | Square rock on S.W. point. -                                      | 8° 25' 37"  | 104° 48' 50" | "         |

## TABLE OF POSITIONS.

| Place.                    | Particular Spot.           | Latitude. | Longitude. | Authorities. |
|---------------------------|----------------------------|-----------|------------|--------------|
| COAST OF COCHIN CHINA.    |                            |           |            |              |
| Cape St. James -          | Lighthouse -               | 10 19 14  | 107 5 20   | Reed.        |
| Saigon -                  | Observatory -              | 10 46 43  | 106 42 40  | "            |
| Cape Padaran -            | - -                        | 11 21 0   | 108 58 0   | Various.     |
| Cape Varela -             | - -                        | 12 55 0   | 109 24 30  | "            |
| Pulo Canton -             | - -                        | 15 24 0   | 109 6 0    | "            |
| Touron bay -              | Observatory island         | 16 7 0    | 108 17 0   | "            |
| TONG KING GULF.           |                            |           |            |              |
| Pak-hoi -                 | Custom house<br>flagstaff. | 21 29 0   | 109 6 0    | Napier.      |
| Guie-chau island          | Summit -                   | 21 1 15   | 109 6 30   | "            |
| HAINAN ISLAND AND STRAIT. |                            |           |            |              |
| Cape Bastion -            | Extreme -                  | 18 9 30   | 109 33 30  | Various.     |
| Gaalong bay -             | East Brother -             | 18 11 30  | 109 41 30  | Ross.        |
| Tinhosa island -          | Southern hill -            | 18 39 45  | 110 28 0   | Various.     |
| Hainan Head -             | - -                        | 20 12 0   | 110 44 0   | "            |
| North Taya island*        | - -                        | 19 58 0   | 111 16 0   | Napier.      |
| Hoi-how -                 | Fort -                     | 20 3 10   | 110 19 30  | "            |
| Cape Cami* -              | - -                        | 20 11 58  | 109 54 30  | "            |
| SOUTH COAST OF CHINA.     |                            |           |            |              |
| Ty-fung-kyoh island       | - -                        | 21 22 30  | 111 10 30  | Ross.        |
| Song-yui point -          | - -                        | 21 31 0   | 111 38 30  | "            |
| Mandarin's Cap -          | - -                        | 21 28 0   | 112 21 30  | "            |
| Hawcheun island           | S.W. point -               | 21 35 0   | 112 31 30  | "            |

\* Approximate position.



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